



## **Butte County Mosquito and Vector Control District**

5117 Larkin Road • Oroville, CA 95965-9250  
Phone: 530-533-6038 • Fax: 530-534-9916  
www.BCMVCD.com

**Matthew C. Ball**  
Manager

### **AGENDA**

#### ***Regular Meeting of the Board of Trustees of the Butte County Mosquito and Vector Control District***

(BCMVCD) Board Room, 444 Otterson Drive, Chico, CA 95928. The Board of Trustees is committed to making its proceedings accessible to all citizens. Individuals with special needs should call District staff at 530-533-6038 or 530-342-7350, Monday through Thursday, 6:00 a.m. to 4:30 p.m. to request disability-related modifications/accommodations or to request materials in alternate formats. All requests for special accommodations and/or alternative format documents must be made 48 hours prior to the meeting.

1. ***Regular Board of Trustees Meeting Time: 4:00 PM Date: February 8, 2023***
2. ***Call to Order – 4:00 PM Roll Call***
3. ***Persons Wishing to Address the Board on Items Not on the Agenda (limit to 5 minutes):***
4. ***Approval of Minutes of the Meeting of: January 11, 2023***
5. ***Persons Wishing to Address the Board Pertaining to Closed Session Matters:***
6. ***Closed Session Announcement (District Legal Counsel Present): N/A***
7. ***Reports: (7.1 - 7.2)***
- 7.1 ***District Manager's Report***

The District Manager will provide a brief report on current District business and activities. The District Manager will also report on District employees, meetings attended, and current projects.

#### ***7.2 Butte County Mosquito and Vector Control (BCMVCD) 2022 Annual Report***

The Vector Ecologist / Fish Biologist will review the 2022 BCMVCD Annual Report.

#### ***8. Policy Matters: (8.1 – 8.3)***

##### ***8.1 Consider Approving Amendments to Personnel Policy, Policy #7085, Health Benefit Plan***

The Board will be asked to consider amendments to Personnel Policy, Policy #7085, Health Benefit Plan. District management is continuing its review of the District's Policy Manual in sections in their efforts to correct typos, make updates to match current processes, and make recommended updates as needed.

##### ***8.2 Consider Approving Amendments to Personnel Policy, Policy #7090, Retirement, Unemployment Insurance, Deferred Compensation***

The Board will be asked to consider amendments to Personnel Policy, Policy #7090, Retirement, Unemployment Insurance, Deferred Compensation.

**8.3 *Fair Political Practices Commission Form 700 Statement of Economic Interest***

This time will be set aside to allow the Board of Trustees to complete the Form 700 Statement of Economic Interest as required by the Fair Political Practices Commission.

**9. *Topic of the Month:***

The Board will watch a presentation on traps used by the District's laboratory.

**10. *Approve Payment of The Bills:***

The Board will be asked to review the demands made upon the District for the past month and consider approving the payment of the bills.

**11. *Personnel:* N/A**

**12. *Correspondence:* N/A**

**13. *Other Business:* N/A**

**14. *Persons Wishing to Address the Board Pertaining to Closed Session Matters:***

**15. *Closed Session Matters (District Legal Counsel Not Present):* N/A**

**16. *Adjournment: (Next Regular Meeting of the BCMVCD Board of Trustees is March 8, 2023)***

***Regular Minutes of the Board of Trustees of the Butte County Mosquito and Vector Control District Meeting held January 11, 2023***

**Members Present:** Michael Barth, Darlene Fredericks, Bruce Johnson, Vice President Dr. Larry Kirk, Philip LaRocca, Assistant Secretary Melissa Schuster, Secretary Bo Sheppard, and Carl Starkey.

**Members Excused:** President Dr. Albert Beck.

**Members Absent:** Chuck Reynolds.

**Also Present:** District Manager Matt Ball, Assistant Manager Aaron Lumsden, Administrative Manager Maritza Sandoval, and Entomologist Amanda Bradford.

1. The Regular Meeting of the Board of Trustees of the Butte County Mosquito and Vector Control District held on January 11, 2023, at 444 Otterson Drive, Chico, CA 95928.
2. The January 11, 2023, Butte County Mosquito and Vector Control District regular meeting of the Board of Trustees was called to order at 4:01 PM by Vice President Kirk.
3. Seeing and hearing no persons wishing to address the Board on items not on the agenda, Vice President Kirk proceeded to request approval of the minutes.
4. After review, it was then moved by Member Sheppard, seconded by Member Starkey, and passed unanimously with a vote of 8 ayes and 0 nays to approve the minutes of the Board of Trustees meeting held December 14, 2022, as written.
5. No persons wishing to address the Board on closed session matters.
6. No closed session matters needing legal counsel.
7. The District Manager reported that Philip LaRocca, Melissa Schuster, and Bo Sheppard were each reappointed to four-year terms.
8. Under election of officers, Vice President Kirk opened nominations for President it was then moved by Member Johnson, seconded by Member Kirk, and passed unanimously with a vote of 8 ayes and 0 nays to elect Member Sheppard as President. President Sheppard nominated Dr. Kirk for Vice President, it was then moved by President Sheppard, seconded by Member Schuster and passed unanimously with a vote of 8 ayes and 0 nays to elect Member Kirk as Vice President. President Sheppard nominated Member Schuster as Secretary, it was then moved by President Sheppard, seconded by Member Kirk and passed unanimously with a vote of 8 ayes and 0 nays to elect Member Schuster as Secretary. President Sheppard nominated Member Johnson as Assistant Secretary, it was then moved by President Sheppard, seconded by Member LaRocca and passed unanimously with a vote of 8 ayes and 0 nays to elect Member Johnson as Assistant Secretary.
9. Reports (9.1 – 9.2)
  - 9.1 Under item 9.1 of reports, District Manager's Report, the District Manager reported that on December 15, 2022, the District completed the monthly staff meeting and all vehicle inspections. The District's Safety Committee met on this date.

The District was closed the week of December 19 and December 26. The District was also closed January 2, 2023, in observance of New Years.

On January 10, 2023, District staff received CPR, first aid, and AED training. All attendees received a two-year certification. This training was provided free of charge from John Holick of Valent Biosciences. Mr. Holick has provided this valuable service for eight years at no cost to the District. As a reminder, the Butte County Grand Jury recommended that District personnel be trained. The Board directed the Manager to contact legal counsel regarding the liabilities of the District owning automated external defibrillator (AED) devices, look into an AED servicing company, and to purchase two AED devices for store at District facilities.

The District Manager reminded the Board that the District will be closed in observance of Dr. Martin Luther King Jr. Day on January 16, 2023.

- 9.2 Under item 9.2 of reports, 2022/2023 2nd Quarter Fiscal Reports, the Administrative Manager reported that current revenues received are at 55.0%, salaries and benefits category is 46.7% expended, services and supplies category is 64.7% expended, capital outlay category is 26.9%. It was then stated that overall expenditures are currently at 51.7% expended.

After this final item of reports, President Sheppard asked the District Manager to proceed to policy matters.

10. Policy matters (10.1)
  - 10.1 Under item 10.1 of policy matters, the Board was asked to consider amendments to Personnel Policies, Policy 7005 Hiring, Age Limits, Advancement, Promotion, and Probation; Policy 7006 Pre-Employment Physical Examinations, and Policy 7010 Care of Property. It was then moved by Member LaRocca, seconded by Member Barth, and after Board discussion it was passed unanimously with a vote of 8 ayes 0 nays to approve and adopt Personnel Policies, Policy 7005 Hiring, Age Limits, Advancement, Promotion, and Probation; Policy 7006 Pre-Employment Physical Examinations, and Policy 7010 Care of Property with recommended edits and amendments proposed by the Board.
11. Under topic of the month, the District's Entomologist gave a presentation on tick-borne diseases.
12. After reviewing the demands made upon the District for the past month, it was then moved by Member Fredericks, seconded by Member Barth, and passed unanimously with a vote of 8 ayes 0 nays to authorize checks numbered 51854 through 50410 to 51953 be signed and distributed. Expenditures for the month totaled \$181,570.97.
13. No items under personnel to report.
14. Under correspondence the Board received and reviewed correspondence from Minasian, Meith, Soares, Sexton & Cooper, LLP, a letter from the City of Biggs, and correspondence from the Town of Paradise.
15. No other business to report.
16. No persons wishing to address the Board pertaining to closed session matters.
17. No closed session matters not warranting legal counsel.
18. President Sheppard announced adjournment at 4:58 PM and concluded by stating that the next regular meeting of the BCMVCD Board of Trustees would meet at 4:00 PM on February 8, 2023, at the Chico Substation's Board Room at 444 Otterson Drive, Chico, CA 95928.

Respectfully submitted,

Melissa Schuster,  
Secretary

On January 12, 2023, the District completed the monthly staff meeting and all vehicle inspections. The District's Safety Committee met on this date.

The District was closed on January 16, 2023, in observance of Dr. Martin Luther King Jr. Day.

On January 19, 2023, District management met virtually with representatives of Matsom & Isom to discuss current projects, evaluate the past month, and to plan for upcoming projects. Also on this date, the District discovered a natural gas leak at the Oroville facility. PG&E was on site to determine the leak was on the District's side of the main and shut the gas off. The District Manager will have a conclusive report by the time of the Board meeting.

On January 24, 2023, all District staff received defensive driver's training. The training was free of charge and provided by the District's insurer, the VCJPA.

On January 25, 2023, the District Manager met with Butte County Public Health's (BCPH) new Epidemiologist. Linda Lewis left BCPH last summer to work with CDPH. This meeting was set up by BCPH's Director.

On January 26, 2023, District management attended the Sac Valley Region meeting. The meeting covered the upcoming MVCAC Board meeting and action items, received reports from industry, CDPH, MVCAC committees, and other districts.

District management and laboratory staff attended the MVCAC Annual Conference January 30 through February 1, 2023. The conference was educational, informative, and well worth attending. Many training sessions on operations, invasive Aedes, vector-borne disease, public relations, and much more.

The District Manager will discuss an upcoming desired building project and present some of the information gathered to date.

Per the Board's direction at the January 11, 2023, Board meeting, the District Manager will report to the Board of the findings of the District's legal counsel and VCJPA's opinion on the District owning and possibly operating an automated external defibrillator (AED).

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# Butte County Mosquito and Vector Control District

## POLICY MANUAL

**POLICY TITLE:** Health Benefit Plan

**POLICY NUMBER:** 7085

**7085.1** The District shall make a health benefit plan (Plan) available to its eligible employees and their dependents. The plan shall be comprised of medical, dental, and vision insurance. Full-time permanent and probationary employees working 30 or more hours per week are eligible for the Plan.

**7085.2** Eligible employees on authorized leaves of absence may participate in the Plan as set forth in Personnel Policies 7030 (Military Leave), 7035 (Pregnancy Disability Leave), 7045 ([California Family Rights Act](#) ~~Care Leave of Absence~~), 7055 (Disability Leave), and 7065 (Other Leaves of Absence).

**7085.3** The effective date of any Plan insurance coverage shall be determined in accordance with insurance policy terms and conditions.

**7085.4** For active, eligible employees, the District shall pay 100% of the monthly insurance premium for the employee coverage and 80% of the monthly insurance premium for dependent and/or family coverage.

**7085.5** For active, eligible employees that qualify for a Health Savings Account, the District shall, at the completion of the first pay period of the year, deposit in that account the amount equal to the current medical insurance plan's deductible for individual employees and the amount equal to the current medical insurance plan's deductible for employees with families covered under the medical insurance plan. For active, eligible employees who do not qualify for a Health Savings Account, the District shall pay directly to them the amount equal to the current medical insurance plan's deductible for individual employees where only the employee is covered under the medical insurance plan and the amount equal to the current medical insurance plan's deductible for employees with families covered under the medical insurance plan, subject to standard deductions and withholdings. It shall be the employee's responsibility to establish and maintain the Health Savings Account and to comply with applicable accounting and tax requirements. For eligible employees commencing work after the first pay period of the year, Health Savings Account contributions shall be on a pro-rata basis.

**7085.6** Participation is voluntary and requires a signed notice if coverage is refused by the employee or any dependents.

**7085.7** Surviving spouse medical insurance benefits.

**7085.7.1** Surviving spouses may continue to participate in the District's medical insurance plan, however, the (a) surviving spouse pays the total premium for such coverage and (b) such continuation of coverage is allowed under the terms of the plan.

**7085.7.2** Premium payments must be delivered to the District office no later than the 15th of the month. Premiums are prepaid and due a month in advance. If premium is not delivered in full to the District's office by the 25<sup>th</sup> of the month, surviving spouse voluntarily terminates from the medical insurance plan and will not be eligible to re-enroll.

**7085.7.3** The term shall be until the surviving spouse turns 65 or is eligible for Medicare, whichever occurs first. To voluntarily terminate, the surviving spouse shall provide the District with at least 30-day advance written notice (where applicable) of the date he/she intends to terminate benefits.

**7085.7.4** Participation is voluntary and requires (when available) a signed notice if coverage is refused by the surviving spouse.

**7085.8** Retired employee medical insurance benefits.

**7085.8.1** Retired employees may continue to participate in the District's medical insurance plan, however, the retired employee pays the total premium for such coverage and (b) such continuation of coverage is allowed under the terms of the plan.

**7085.8.2** Premium payments must be delivered to the District office no later than the 15th of the month. Premiums are prepaid and due a month in advance. If premium is not delivered in full to the District's office by the 25<sup>th</sup> of the month, retired employee voluntarily terminates from the medical insurance plan and will not be eligible to re-enroll.

**7085.8.3** The term shall be until the retired employee turns 65 or is eligible for Medicare, whichever occurs first. To voluntarily terminate, the retired employee shall provide the District with at least 30-day advance written notice (where applicable) of the date he/she intends to terminate benefits.

**7085.8.4** Participation is voluntary and requires (when available) a signed notice if coverage is refused by the retired employee.

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# Butte County Mosquito and Vector Control District

## POLICY MANUAL

**POLICY TITLE:** Retirement, Unemployment Insurance, Deferred Compensation  
**POLICY NUMBER:** 7090

**7090.1 Retirement:** The District will participate in the California Public Employee's Retirement System (CalPERS). Participation is required for all permanent employees who are employed 20 or more hours per week or as specified in the District contract with California Public Employees Retirement System. The original contract is found at page 24-5 of the official minutes, and is subject to amendment by the Retirement System Board of Control.

**7090.2 District contribution:** The District amended its CalPERS Retirement Plan to implement 2.5% @ 55 plan, using average compensation for the highest 3 years of service, in accordance with PERS rules and regulations for all employees who are employed for 20 or more hours per week or as specified in the District Contract with CalPERS who were employed on or before December 31, 2012. ~~The District will continue to fund a portion of the employee's contribution per the M.O.U. to said plan, it being understood that the employees will fund the additional employee portion required by PERS for the 2.5% @ 55 Plan. The District will fund the required employer's contribution of said plan. The employee will fund the amount of the employee's contribution.~~

**7090.2.1** All employees hired on or after January 1, 2013, will be subject to AB 340 and the Pension Reform Act. Miscellaneous CalPERS members will have CalPERS retirement with terms of 2% @ 62 plan, using the average compensation for the highest 3 years of service in accordance with CalPERS rules and regulations for all employees who are employed for 20 or more hours or as specified in the District's contract with CalPERS and in accordance with state law. The District will fund the required employer's contribution of said plan. The employee will fund the required amount of the employee's contribution.

**7090.3 Unemployment Insurance:** The District is required by law to provide unemployment insurance coverage for its employees. The District has elected to participate in the program provided by the State of California.

**7090.4 Deferred Compensation:** In order to provide a means for participation in a deferred compensation plan for all permanent employees, the District will act as the Signatory ~~on for the following Plans: ING, ICMA and Valic or any other providers of~~ Deferred Compensation plans.



20  
22



# Butte County Mosquito & Vector Control District

*Since 1948*

**ANNUAL REPORT  
2022**





# BUTTE COUNTY MOSQUITO AND VECTOR CONTROL DISTRICT

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## CONTACT INFORMATION

**Butte County Mosquito and Vector Control District**  
**5117 Larkin Road, Oroville, California 95965**  
**(530) 533-6038 (530) 342-7350**  
**Fax (530) 534-9916**

**Visit us on the web at [www.buttemosquito.com](http://www.buttemosquito.com)**

*Front Cover: Regional Supervisor Shane Cassity droplet testing ULV gas fogger*  
*This institution is an equal opportunity provider and employer*

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# MANAGER'S FOREWORD

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It is my honor to submit the 2022 Annual Report for the Butte County Mosquito and Vector Control District. The District had a very successful year serving the residents of Butte County and Hamilton City by utilizing an integrated vector management (IVM) approach that included public education and outreach, vector surveillance, reduction of breeding grounds by physical and cultural control by altering the environment and/or management practices, and by using sound biological and chemical control methods. This report outlines the work conducted by the District to accomplish its primary goal of protecting public health.

The prevention of vector-borne disease outbreaks remains the District's primary goal and its most important responsibility to the public. West Nile virus (WNV) has long been considered to be endemic in the state of California and remains the District's largest public health concern. The state observed another extremely active WNV season and for the past several years St. Louis encephalitis has again started to become active in parts of the state. The extraordinary efforts to combat the WNV epidemic and St. Louis encephalitis resurgence in California should be credited to the combined efforts of more than 60 mosquito and vector control districts and local health departments, working in close cooperation with the California Department of Public Health and numerous other agencies indirectly related to mosquito and vector control.

For the third year in a row, *Aedes aegypti*, a major public health concern and an invasive species, was collected and identified in Butte County. Detections of this mosquito were found in Chico, Oroville, Thermalito, and Paradise. Through the challenges of 2022, the District was still able to perform the essential services the public we serve have come to rely on and responded to 1921 service requests.

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The District continues to aggressively control unmaintained / abandoned swimming pools, catch basins, storm drains, and retention / detention ponds and works in partnership with other local agencies and governments to maintain improper functioning utilities that could and have bred mosquitoes. Regardless of drought conditions, the over-watering of landscaped yards and environments continues to add to the mosquito breeding problems in urban mosquito sources and extends the length of our mosquito season. In addition to urban mosquito breeding problems, the District continues surveillance and control in agricultural, rural, and wetland areas that breed mosquitoes. Due to two newly established invasive mosquito species in the state of California and now within Butte County, the District has greatly expanded surveillance efforts to detect either of these two species of mosquitoes. The District continues to conduct surveillance of ticks of medical importance and surveillance and control of yellow jackets.

“The Mission of the Butte County Mosquito and Vector Control District is primarily to suppress mosquito-transmitted disease and to also reduce the annoyance levels of mosquitoes and diseases associated with ticks, fleas, and other vectors through environmentally compatible control practices and public education.” To achieve this goal the District provides continual surveillance of mosquitoes and other vectors to ascertain the threat of disease transmission and annoyance levels and then uses integrated vector management methods to keep mosquitoes and other vectors below those levels. The District continues to work in cooperation with property owners, residents, social groups, and other governmental agencies to minimize mosquito breeding and to reduce the threat of mosquito-transmitted diseases.

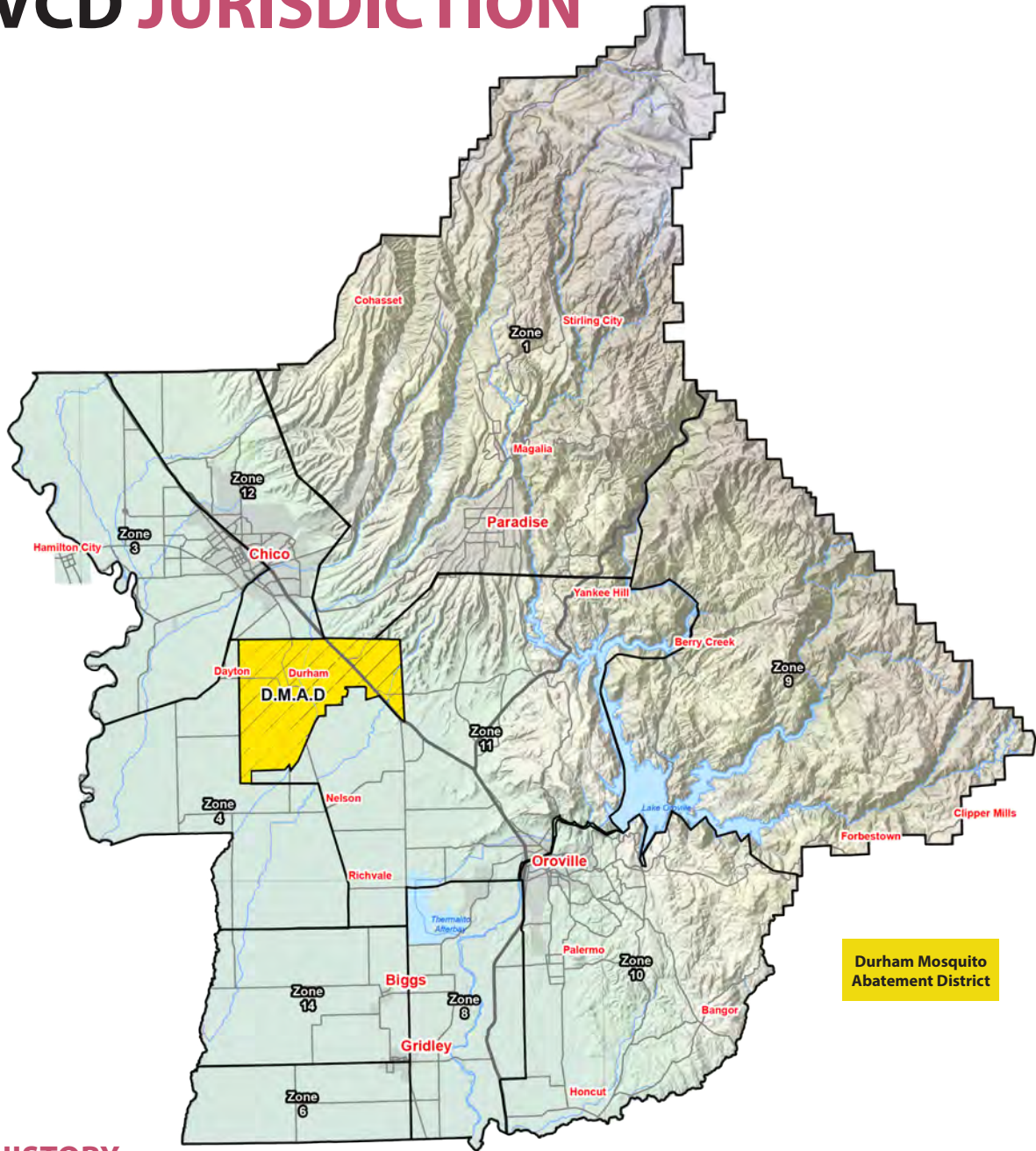
The Board of Trustees and employees continue to plan and search for better ways to improve our programs to be prepared for future disease outbreaks that would be a threat to the health of Butte County and Hamilton City residents. We look forward to providing our services to you in the future and if you have any questions or need more information, please visit our website at [www.ButteMosquito.com](http://www.ButteMosquito.com) or call us at 530-533-6038 or 530-342-7350.

Respectfully,

**MATTHEW C. BALL**

*District Manager*

# BCMVCJ JURISDICTION



Durham Mosquito Abatement District

## DISTRICT HISTORY



District Formed

1948

Relocated from Biggs to current location in Oroville

1950s

Relocation



Annex Hamilton City

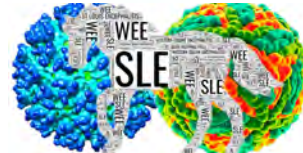
1986

Annexation of Hamilton City, Glenn County, into the District's Service Area

Western Equine and St Louis Encephalitis virus identified in service area

1990s

WEE and SLE



District Name

1993

District name changed to Butte County Mosquito and Vector Control District

6 Butte County Mosquito Abatement District formed to confront Malaria

# Mission

The mission of the Butte County Mosquito and Vector Control District is to primarily suppress mosquito-transmitted disease and to also reduce the annoyance levels of mosquitoes and diseases associated with ticks, fleas and other vectors through environmentally compatible control practices and public education.



## Main Office Location



5117 Larkin Road  
Oroville, CA. 95965

## Substation Location



444 Otterson Drive  
Chico, CA. 95928

West Nile Virus Arrives in Butte County



New Chico Substation

2004

West Nile Virus



Special Benefit Assessment to enhance and improve all services provided by the District

2014

New Benefit Assessment



Annex DMAD Areas

2018

Annexation of Durham Mosquito Abatement's 23 mi<sup>2</sup> of Rice and Wetlands

Annexation of Oroville Mosquito Abatement District's 12 mi<sup>2</sup> service area

2021

Annex OMAD



# BUTTE COUNTY MOSQUITO AND VECTOR CONTROL DISTRICT PERSONNEL

Name	Title	Area Represented	Term Expires
Dr. Albert Beck	Board President	County District 1	12/31/2025
Carl Starkey	Board Trustee	County District 2	12/31/2024
Philip LaRocca	Board Trustee	County District 3	12/31/2022
Darlene Fredericks	Board Trustee	County District 4	12/31/2025
Michael Barth	Board Trustee	County District 5	12/31/2023
James Bo Sheppard	Board Secretary	City of Biggs	12/31/2022
Dr. Larry Kirk	Board Vice President	City of Chico	12/31/2025
Bruce Johnson	Board Trustee	City of Gridley	12/31/2023
Melissa Schuster	Board Assistant Secretary	Town of Paradise	12/31/2022
Chuck Reynolds	Board Trustee	City of Oroville	12/31/2023
Vacant	Board Trustee	Hamilton City	



**Doug Weseman**

Congratulations to Doug, who retired from the District in May, 2022. Doug began working for the District in 2008 as the Public Education Coordinator; from which he promoted to the Public Information Officer and eventually finishing his career as the Assistant Manager. Over the years, Doug made his mark on the District by spearheading projects such as: quarterly and annual reports, the creation of the District's first website, creation of the District's first mosquito software program, implementation and management of IT for the District, and public relation campaigns just to name a few. Doug was an integral part of the District's success and helped to advance the District into the modern age of business. Thank you Doug for your years of service to the District and good luck to all your future endeavors!

Name	Title
Matt Ball	District Manager
Aaron Lumsden	Assistant Manager
Del Boyd	Pilot II
Maritza Sandoval	Administrative Manager
Sara MacKenzie	Office Assistant
Amanda Bradford	Entomologist II
Ryan Rothenwander	Vector Ecologist/ Fish Biologist
Shane Cassity	Regional Supervisor
Kenny Armstrong	MVCS
Kellen Larson	MVCS
Shane Robertson	MVCS
Eric Dillard	MVCS
Glen Williams	MVCS
Jeremy Edwards	MVCS
Aaron Goff	MVCS
Charlie Favilla	MVCS
Frank Lopez	MVCS
Mike Mattia	MVCS
Stephen Anaya	Yard Assistant Seasonal
Stephanie Burnham	MVC Assistant Seasonal
Colton Chenoweth	MVC Assistant Seasonal
Daniel Flesher	MVC Assistant Seasonal
Elijah Hill	MVC Assistant Seasonal
Parker Kent	MVC Assistant Seasonal
Michael Langley	MVC Assistant Seasonal
Ashley Mullins	MVC Assistant Seasonal
Colton Schafer	MVC Assistant Seasonal
Jason St. Clair	MVC Assistant Seasonal
Kyle Theus	Lab Assistant Seasonal



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## BOARD OF TRUSTEES



*Back Left to right:*

James Bo Sheppard  
Carl Starkey  
Michael Barth  
Melissa Schuster

*Front Left to right:*

Bruce Johnson  
Dr. Larry Kirk  
Philip LaRocca

*Not Pictured:*

Darlene Fredericks  
Dr. Albert Beck  
Chuck Reynolds

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## BCMVC D STAFF



Front Row Left to Right: Del Boyd, Amanda Bradford, Maritza Sandoval, Sara MacKenzie, Matt Ball, Ryan Rothenwander, Kenny Armstrong, Mike Mattia, Jeremy Edwards

Back Row Left to Right: Glen Williams, Eric Dillard, Aaron Goff, Kellen Larson, Shane Cassity, Aaron Lumsden, Frank Lopez, Charlie Favilla, Shane Robertson

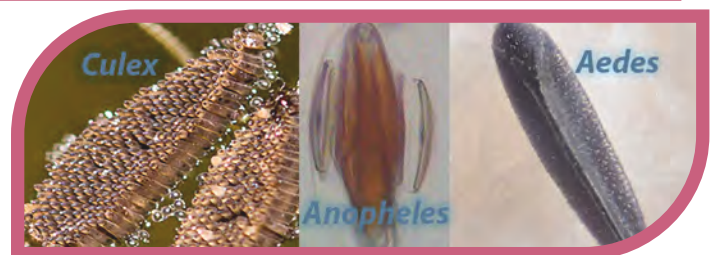
# MOSQUITO BIOLOGY

## There are more than 3,500 species of mosquitoes around the world

In California, we have about 50 species and of those, only a few are considered public health threats due to their potential to transmit mosquito-borne diseases to humans. People who have been bitten by a mosquito infected with viruses such as West Nile, Saint Louis Encephalitis, Dengue, and Zika may develop life-threatening or life-altering diseases. For the District and residents of Butte County to effectively reduce mosquito populations and the chance of getting a mosquito-borne disease, it is important to understand the habits and behaviors of the different mosquito species. This water can range in quality, and it can be in any container imaginable. The mosquito goes through four separate and distinct stages of its lifecycle: egg, larva, pupa, and adult. Some species can go through their entire life cycle in as little as four days. All mosquitoes must have water to complete their lifecycle.

### Egg

Eggs are laid on or near water or where water will be. They may be laid one at a time or stuck together in rafts of 100-300 eggs. Most eggs hatch into larvae within 48 hours of coming into contact with water.



### Larva

Larvae live in water and breathe air from the surface. Larvae feed on micro-organisms and organic matter in the water. They shed their skin four times growing larger after each molt. The stages between molts are called instars. When the 4<sup>th</sup> instar larva molts it becomes a pupa.

### Pupa

Mosquito pupae also float at the water surface and breathe air. When disturbed, they dive in a tumbling motion and then float back to the surface. The pupal stage is a non-feeding stage. This is the time the mosquito turns into an adult. It takes two days before the adult is fully developed.

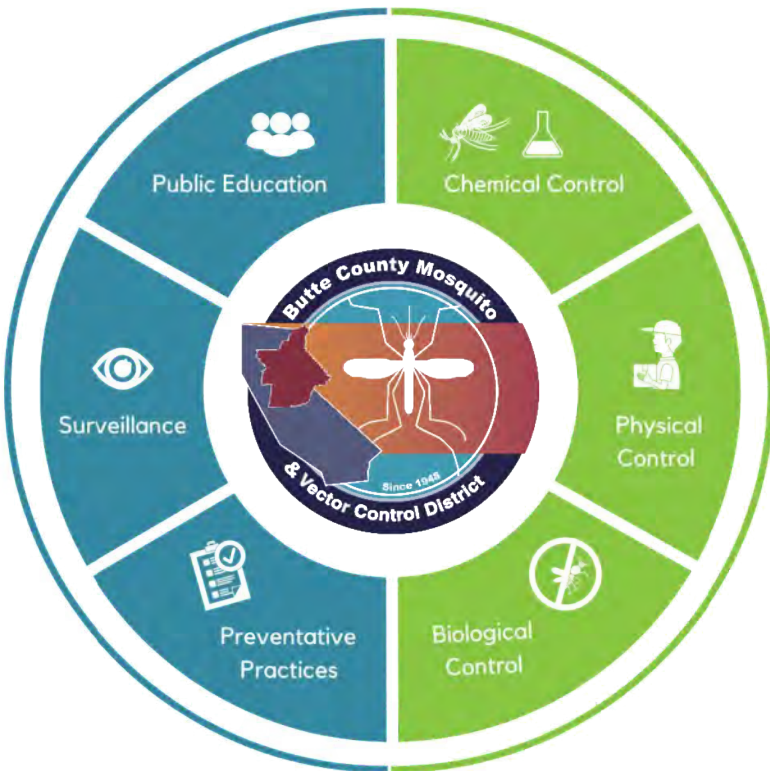
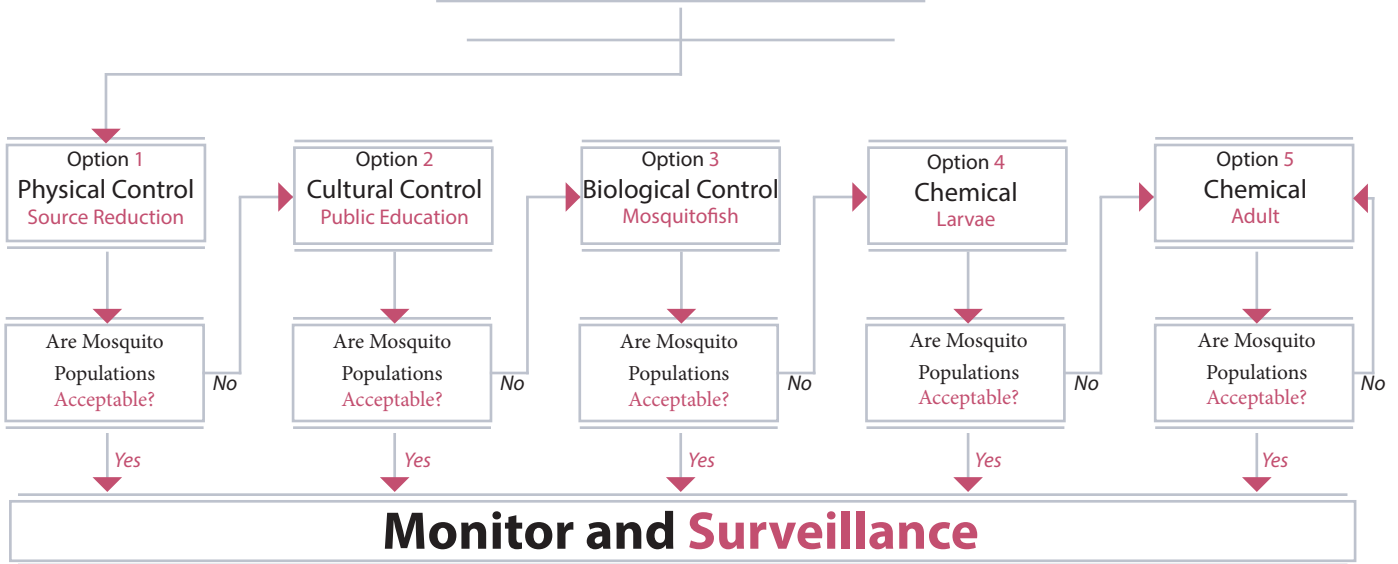


### Adult

Newly emerged adults rest on the surface of the water for a short time to allow itself to dry before taking flight. Female mosquitoes feed to get a sufficient blood meal to develop eggs. Male mosquitoes feed only on plant nectar. The life span of the adult mosquito usually depends on several factors: species, temperature, humidity, gender, and time of year. Males live shorter lives.



# INTEGRATED VECTOR MANAGEMENT



Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management that relies on a combination of common sense practices. The District's IPM program uses current and comprehensive information on the life cycles of pests and their interaction with the environment. This information, along with available pest control methods, is used to manage pest nuisance and public health threats by the most economical means and with the least possible hazard to people, property, and the environment. The District's IPM includes public education, physical control, biological control, chemical control, and continuous monitoring.

Each time one of the District's state certified vector control technicians locates a mosquito breeding source, the flow chart above is followed.

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Simply cleaning up around the yard, dumping containers and storing things properly can *eliminate* mosquito breeding sources.



Using materials such as sand or a water absorbing polymer, can fill in tree holes, *excluding them from* holding water and preventing mosquito breeding.



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## PHYSICAL CONTROL SOURCE REDUCTION

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The best method of mosquito control is source elimination (the complete removal of standing water). All mosquitoes need water to breed, unfortunately water is vital to keep lawns green, to grow crops, to sustain life, and to provide habitat for other aquatic insects and animals. District Mosquito and Vector Control Specialists actively work with property owners, land managers, and municipalities to reduce the amount of water needed for irrigation, to observe or consider best management practices, to actively participate in the design of new developments, and the overall reduction of standing water on a property.



public by arming residents with knowledge to prevent mosquito bites and reduce or eliminate mosquito-breeding through informational pamphlets, website information, best management practice manuals, repellent suggestions, one on one interaction, and homeowner safeguards. In 2010, the District and the Board of Trustees adopted a final version of a Best Management Practices (BMP) to Reduce Mosquitoes manual. The manual provides property owners with tools and techniques to minimize mosquito populations through the proper use of land management practices while reducing the use of pesticides. The BMP's contained in the manual are assembled from a number of sources including scientific literature, state and inter-agency documents, and from experienced vector control professionals. The BMP manual includes general guidance to all properties that can, have, and will breed mosquitoes. A copy of the BMP manual can be viewed on the District's website at [www.buttemosquito.com](http://www.buttemosquito.com). The manual has successfully been used to reduce mosquito populations/public health threats without the need of additional pesticides.

**PUBLIC EDUCATION OUTREACH**  
**BEST MANAGEMENT PRACTICES**

The District's mission is to protect residents from mosquitoes and other vectors that transmit disease. Public education and information are important parts to the success of combating diseases such as West Nile virus and Lyme disease. The District's education program consists of public appearances at local city and county fairs, participation in the state Mosquito and Vector Awareness week, and presentations at schools and local civic groups. In addition to the above, the District strives to find new and more effective ways of better educating the

## PUBLIC EDUCATION HIGHLIGHTS

The District was able to continue its billboard campaign and partnered with Lamar Advertising. The 2022 slogan was “Prevent Mosquitoes and West Nile Virus”. Eight billboards rotated throughout the county and ran from May through September.

With the detection of *Aedes aegypti* mosquitoes in Chico, Oroville and Paradise in 2022, the District responded with invasive *Aedes* brochures, door hangers, and mailers. The mailers were sent out to all residences and businesses within a two to three mile radius of the *Aedes* detections. The District sent out 1,521 mailers in Paradise. The mailers included a detailed description of the *Aedes* mosquito, where they can be found, and how to report any findings to the District.

The District also renewed its contract with Action News Now and ran a television public service announcement (PSA) and a broadcast announcement on KIXE-PBS. The PSA and broadcast announcement ran from May through the end of September.

Radio advertising continued this year with Deer Creek Broadcasting and Results Radio. These programs ran through the end of September.

Newsprint advertising with the Enterprise-Record and the Chico News and Review ran from May through September.

The District also held a presentation in the City of Biggs on October 11th for 3rd and 4th graders. The presentation included mosquito biology, mosquito prevention, display cases and District information.

The District believes that through public education, people learn the importance of avoiding/preventing mosquito bites to avoid getting a mosquito-borne illness. The District suggests that residents prevent mosquito bites by staying inside at dusk and dawn when mosquitoes are most active, wearing repellent and long sleeves and pants when outside during peak mosquito activity, and making sure their door and window screens are in good working condition. Residents are also asked to check their property for mosquito breeding sources and drain any unnecessary standing water.

### District Public Relations Highlights 2022

- Billboard Advertising
- Chico News & Review, Enterprise-Record, Print Advertising
- Television Public Service Announcements
  - Action News Now
  - KIXE-PBS
- Print, Radio, and Television Interviews
- Radio Advertising
  - Deer Creek Broadcasting
  - Results Radio
- Invasive *Aedes* Brochures, Mailers, and Door Hangers
- Gold Nugget Craft Faire- Paradise
- Red Suspenders Days- Gridley
- Salmon Festival- Oroville
- School Presentation- Biggs





## INVASIVE MOSQUITO SPECIES OF CALIFORNIA



**PUBLIC HEALTH WARNING: REPORT DAY-BITING MOSQUITOES**  
Please call the BUTTE COUNTY MOSQUITO & VECTOR CONTROL DISTRICT to schedule an inspection at (530) 533-6038

## INVASIVE MOSQUITOES FOUND IN YOUR AREA

***Aedes aegypti***  
Yellow Fever mosquito



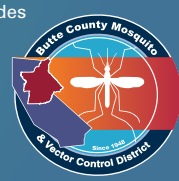
 Actual Size: About 1/4 inch long

### WHY THE CONCERN?

*Aedes aegypti* is an invasive mosquito in California that is capable of transmitting several diseases including Zika, dengue, and chikungunya. While there have been no local transmissions detected to date, the identification and control of this invasive mosquito is important to protect public health.

### About *Aedes aegypti* mosquitoes

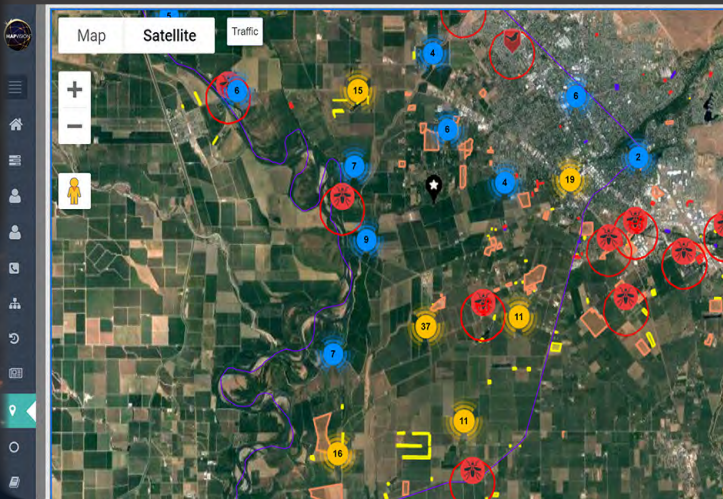
- Small dark mosquito that bites during the day.
- Prefers to dwell in urban areas indoors and outdoors.
- They especially like to bite ankles, wrists and elbows.
- They lay eggs in small sources of water around homes.
- They are very difficult to control.
- They complete their life cycle in 7-10 days. The adults live for about 3 weeks.
- Invasive *Aedes* are "container breeders". Individual eggs are glued to the sides of containers. Eggs are resistant to drying out and can survive for many months until water covers them.



## TECHNOLOGICAL APPLICATIONS

### Mapvision®

The District continues to use the Geographical Information System (GIS) that first went live in 2018. The new system, MapVision®, is a geospatial web-based data management system. Every workflow associated with each department within a vector control agency is automated, streamlined and results in cross department enterprise data sharing and data integrity. Management, finance/billing, employee time tracking, inventory, operations, treatment applications, field technician activities, laboratory processes, maintenance, vehicles, equipment, and reporting are a few of the core features MapVision® Enterprise offers. Examples include: inter-agency/commercial invoicing, employee time card tracking/payroll, and real time synchronization with state reporting databases such as CalSurv Gateway. Three unique components available in MapVision® Enterprise are a 'Heightened Surveillance' feature designed to monitor for invasive species and newly emerging pathogens in mosquitoes, ticks, and wildlife. The team concentric 'Parcel Inspection' program is based off of the heightened surveillance feature and the 'Resistance Management' module. MapVision® Enterprise dynamically bridges all vector control departments in real time, resulting in the most efficient, effective, and resourceful geospatial data management solution available.



'Heightened Surveillance' feature designed to monitor for invasive species and newly emerging pathogens in mosquitoes, ticks, and wildlife. The team concentric 'Parcel Inspection' program is based off of the heightened surveillance feature and the 'Resistance Management' module. MapVision® Enterprise dynamically bridges all vector control departments in real time, resulting in the most efficient, effective, and resourceful geospatial data management solution available.



[SERVICES](#) [VECTOR & DISEASES](#)



# Mosquito Season is Here!

*Temperatures are Rising and Mosquitoes are Flying.*

WEST NILE VIRUS ACTIVITY



## E-mail Notifications

Since 2011, the District has been using a mosquito fogging email notification system. The email notification system was created to meet public concerns and expectations, to enhance media coverage, and to help inform other agencies that need to know when and where the District is mosquito fogging. The Chico Enterprise Record uses these fogging notifications in their newspaper to inform their readers of the planned fogging operations. To meet these needs, the District used Constant Contact software modeled after the award-winning Contra Costa Mosquito and Vector Control District's email notification system, to compose and send out the fogging notifications via email. These email notifications are sent out, in most cases, 24 hours before a fogging operation takes place. The notifications include maps of the areas to be fogged, links to the labels and material safety data sheets of the public health pesticides used, the dates and times of the scheduled fogging operations, and a link to the District website. The public can sign up for email notifications on the District website, [www.buttemosquito.com](http://www.buttemosquito.com). The District website also has the links to the public health pesticides. The District also makes phone calls to notify residents and agencies that do not use email or have access to a computer.

### Mosquito Fogging Notice

Fogging will be conducted in the Dayton area. The application is scheduled to take place tomorrow, October 05, 2021, from approximately sunset to 11:00 PM.



Fogging is predicated on mosquito abundance, disease activity, and requests from the public. Fogging operations may be cancelled due to unfavorable weather conditions. For questions regarding fogging, please see the link below.

[Link to FAQ's](#)

## [www.buttemosquito.com](http://www.buttemosquito.com)

On the website, the user can make a service request, sign up for email notification of upcoming fogging operations, view vector-borne disease activity in the District, and view maps of where the District will be fogging and where the District has fogged in the past. The user can also view Board of Trustee agendas and minutes, read the latest news that affects the District and their constituents, and view information on viruses and other diseases that are transmitted by mosquitoes and other vectors such as ticks. Visitors to the website may also be interested in the mosquitofish page and the services page which lists the locations in Butte County and Hamilton City where residents can pick up free mosquitofish. The services page also includes yellowjacket and wasp nest removal, tick and insect identification, and a public education section where interested parties can find out how to request the District come to their school or service group for a presentation. The website also has links to the pesticide labels and SDS sheets for the public health pesticides that it uses as well as a frequently asked questions page and a "Contact Us" page.

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## VECTOR AND VECTOR-BORNE DISEASE SURVEILLANCE

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The definition of a vector is any animal capable of producing discomfort or injury, including, but not limited to, mosquitoes, flies, other insects, ticks, mites, and rats but not including domestic animals according to the California State Health and Safety Code, Section 2002(K). Surveillance of vectors is a vital component of the District's Integrated Vector Management (IVM) Program, and a considerable amount of time and effort is devoted to conducting vector surveillance. The District's surveillance program consists of a scientific approach for locating vector populations usually focusing on mosquito-breeding sources, monitoring mosquito populations, and mosquito-borne disease. Data collected from the surveillance program is analyzed to determine maximum and minimum risk periods of public exposure to mosquito-borne disease, evaluates control efforts, and seasonal changes in relative abundance of mosquito species. Surveillance data is collaborated in the District's database which provides historical information on mosquito dynamics and mosquito-borne disease within the District.



The District has an entomology department (Lab) that is staffed with an Entomologist, Vector Ecologist, and a Lab Assistant. The District's entomology department is responsible for the identification of the trapped mosquito collections and reporting the population numbers to the California Department of Public Health. The Lab conducts virus testing on live mosquitoes, dead birds, and sentinel chicken flocks. These tests are the District's eyes to monitor and detect mosquito-borne viruses in and around the county. The Lab also conducts scientific pesticide trials to monitor the chemicals effectiveness on targeted mosquitoes and to assess the possible effects on non-targets and trials on new chemical methodology and/or new chemicals. The Lab is also at your service to identify ticks, arachnids, and other insects/arthropods of public health significance.

*The District utilizes an extensive surveillance program for both adult and immature (larval) mosquitoes. Throughout Butte County and the Hamilton City area of Glenn County, the District uses 28 New Jersey light traps, 31 gravid traps, over 40 CO2 traps, and 7 sentinel chicken flocks to monitor adult mosquito populations and virus activity. District Mosquito and Vector Control Specialists (MVCS) monitor larval mosquito populations throughout the entire District daily utilizing a standard one-pint dipper. District MVCS spend the majority of their day inspecting standing water such as rice, wetlands, storm drains, ponds, ditches, swimming pools, bird baths, fountains, seasonal and/or other man-made containers for larvae.*

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## VIRUS SURVEILLANCE

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### 2022 VIRUS SURVEILLANCE REPORT

The District monitors for Western equine encephalitis (WEEV), St. Louis encephalitis (SLEV), and West Nile virus (WNV) activity by collecting blood samples from sentinel chicken flocks strategically placed throughout the District, collecting live mosquitoes trapped throughout the District, and collecting dead wild birds District wide.

### SENTINEL CHICKEN FLOCKS

Annually, the District maintains seven sentinel chicken flocks of six birds each. The flocks are located in Palermo, Honcut, Gridley, Biggs, South Chico, West Chico, and Hamilton City. Bi-weekly blood samples are taken from the sentinel chickens by the entomology staff and sent to CDPH for testing. The blood sample is tested for SLEV, WEEV, and WNV. **In 2022, 26 of the 42 sentinel chickens from all 7 District flocks tested positive for WNV.** Seropositive chickens are always delayed at least two weeks from positive mosquito pools in the same location. Therefore, in the upcoming year, future research efforts will be needed to investigate the costs and surveillance efficiency of this program.

### DEAD BIRD SURVEILLANCE

The District has participated in the California Department of Public Health's (CDPH) WNV dead bird testing program. County residents participate in the program by calling CDPH's dead bird hotline (1-877-WNV-BIRD) or by submitting an online form at [www.westnile.ca.gov](http://www.westnile.ca.gov) or [www.ButteMosquito.com](http://www.ButteMosquito.com). After a dead bird has been reported, CDPH notifies the District and District staff retrieves the bird and submits it for WNV testing.



Sentinel Chickens



Chicken Coop  
Palermo, CA

### MOSQUITO POOLS

Each week the District's entomology staff strategically places traps known as encephalitis virus surveillance (EVS) traps around the District. The entomology staff will identify and sort the trapped mosquitoes and pool the collections for virus testing. A pool consists of 1 to 50 adult female mosquitoes of the same species. Pooled mosquitoes are transferred to numbered vials and sent to the Center for Vector-Borne Disease Research (CVBDR) at the University of California, Davis and are tested for WEEV, SLEV, and WNV. **In 2022, the District sent 442 mosquito pool samples with 39 returning positive for WNV.**

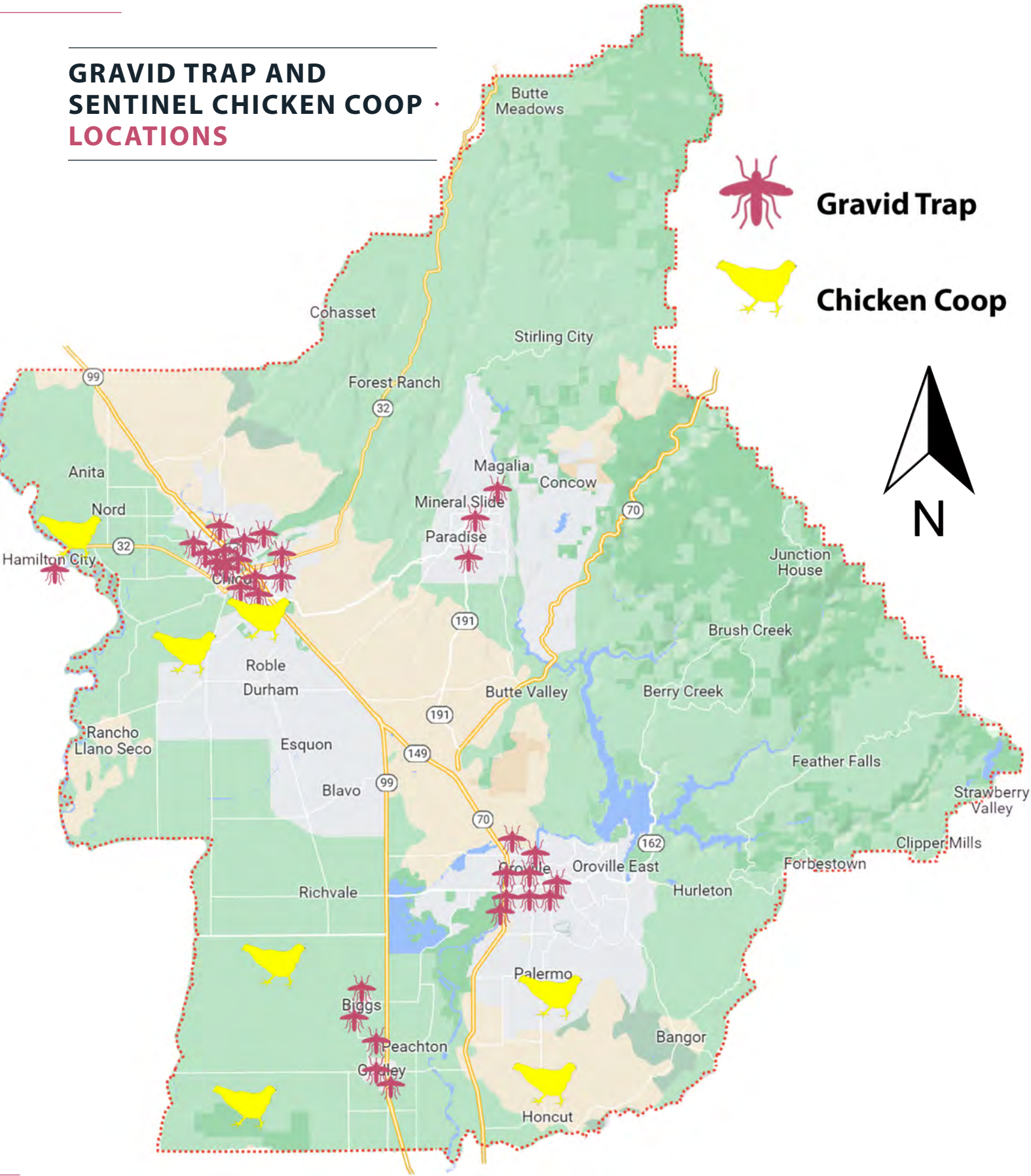
# GRAVID TRAP AND SENTINEL CHICKEN COOP LOCATIONS



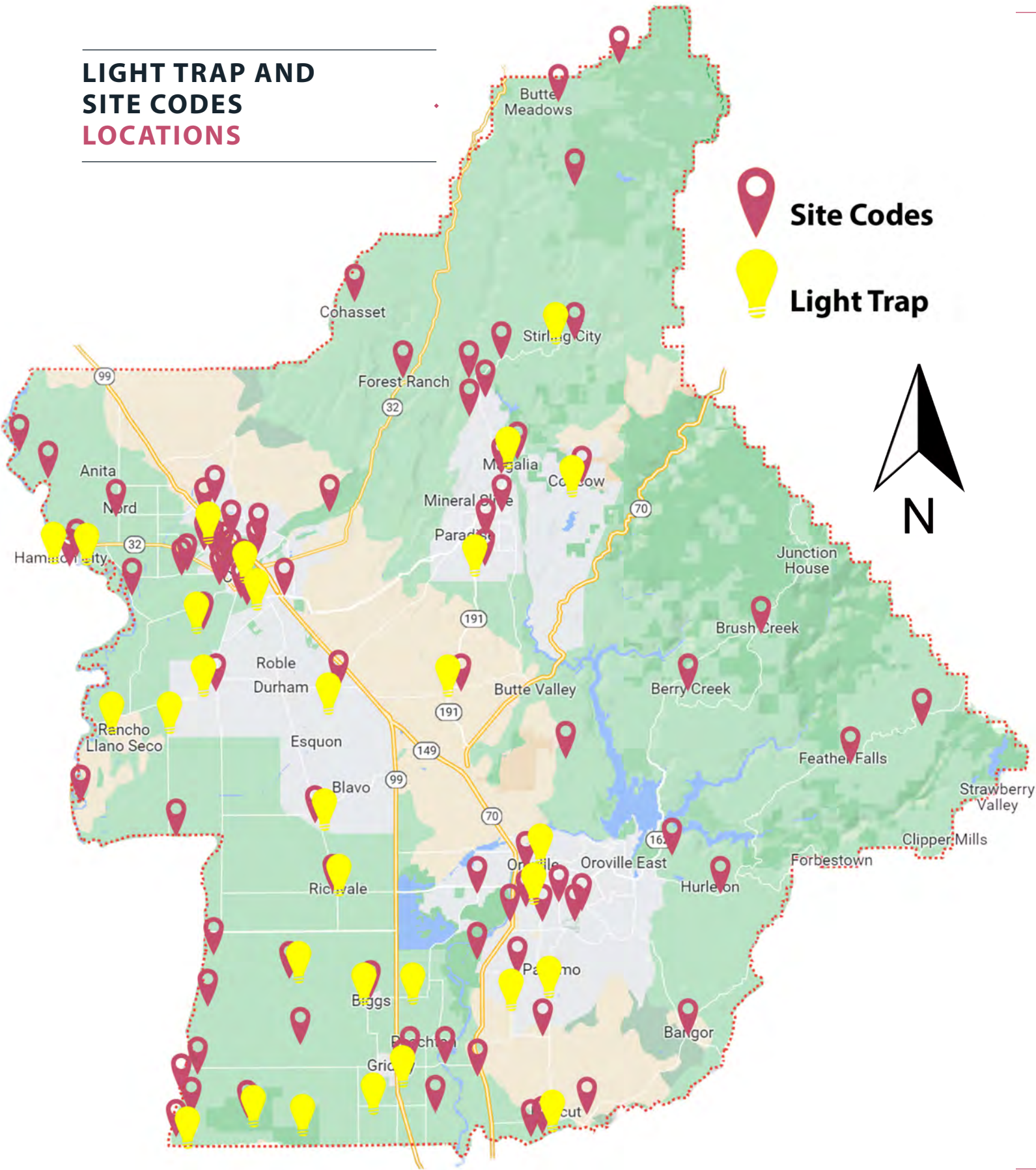
**Gravid Trap**



**Chicken Coop**



# LIGHT TRAP AND SITE CODES LOCATIONS



## 2022 NEW JERSEY LIGHT TRAP COLLECTIONS

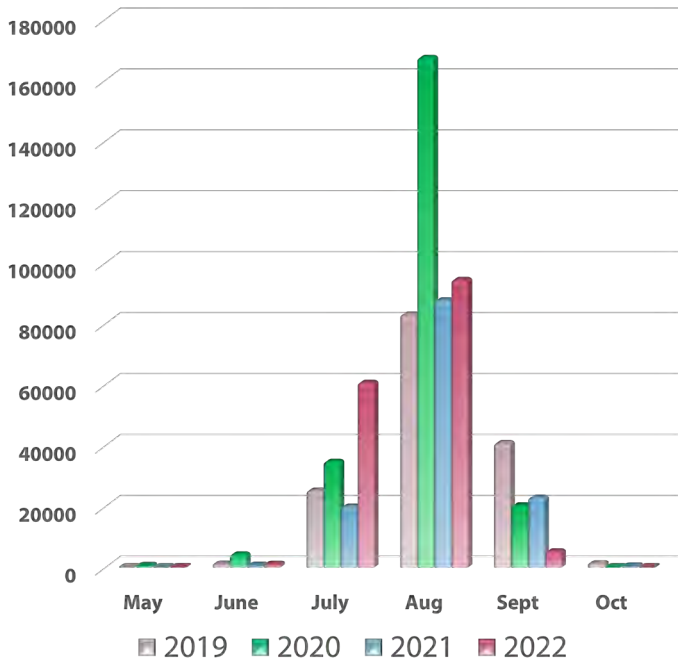
Mosquito Species	Number Collected	% of Total
<i>Anopheles freeborni</i>	138539	66.52%
<i>Culex tarsalis</i>	32182	15.45%
<i>Aedes melanimon</i>	29669	14.25%
<i>Culiseta inornata</i>	3801	1.83%
<i>Aedes nigromaculis</i>	1539	0.74%
<i>Culex pipiens</i>	1226	0.59%
Other species	720	0.35%
<i>Culex stigmatosoma</i>	589	0.28%



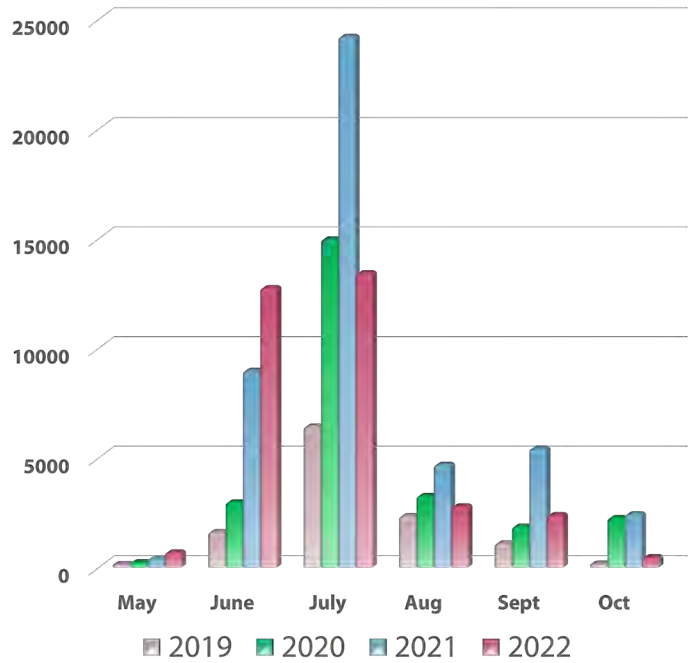
Jeremy Edwards  
Hanging Light Trap

# NEW JERSEY LIGHT TRAP SEASONAL FLUCTUATIONS OF VECTOR-BORNE DISEASE VECTORS

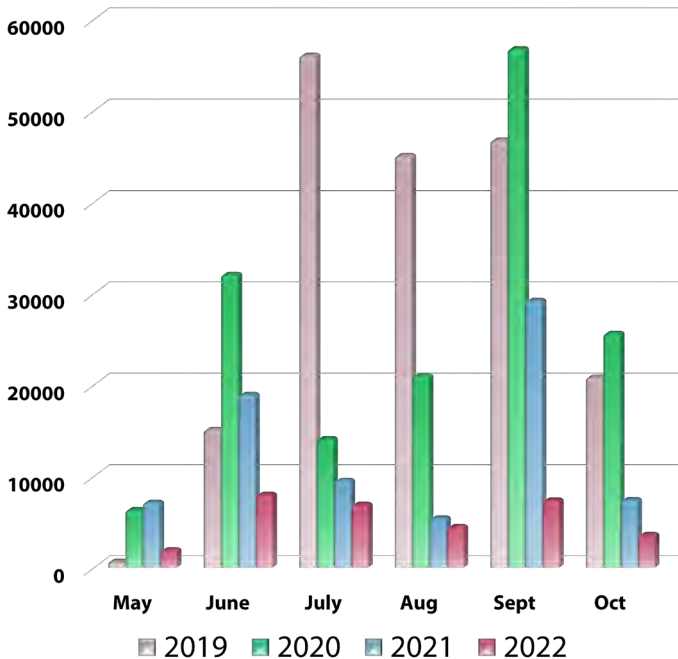
## Anopheles freeborni



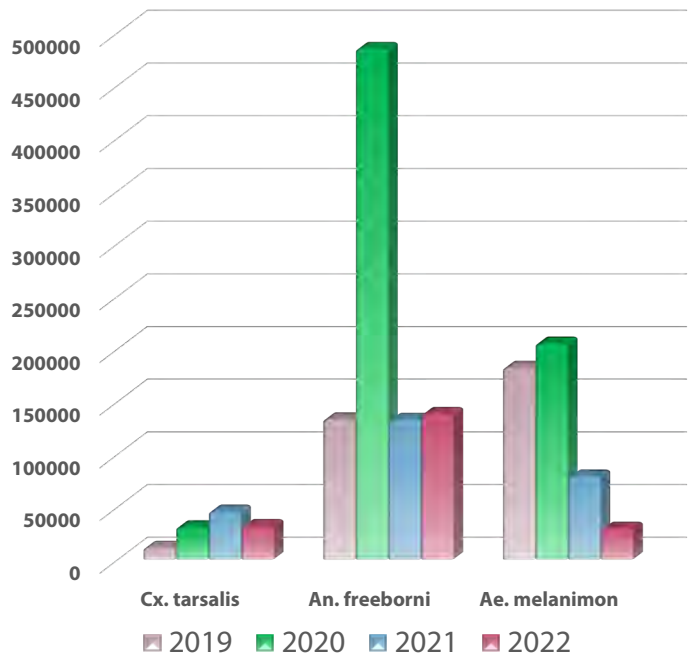
## Culex tarsalis



## Aedes melanimon

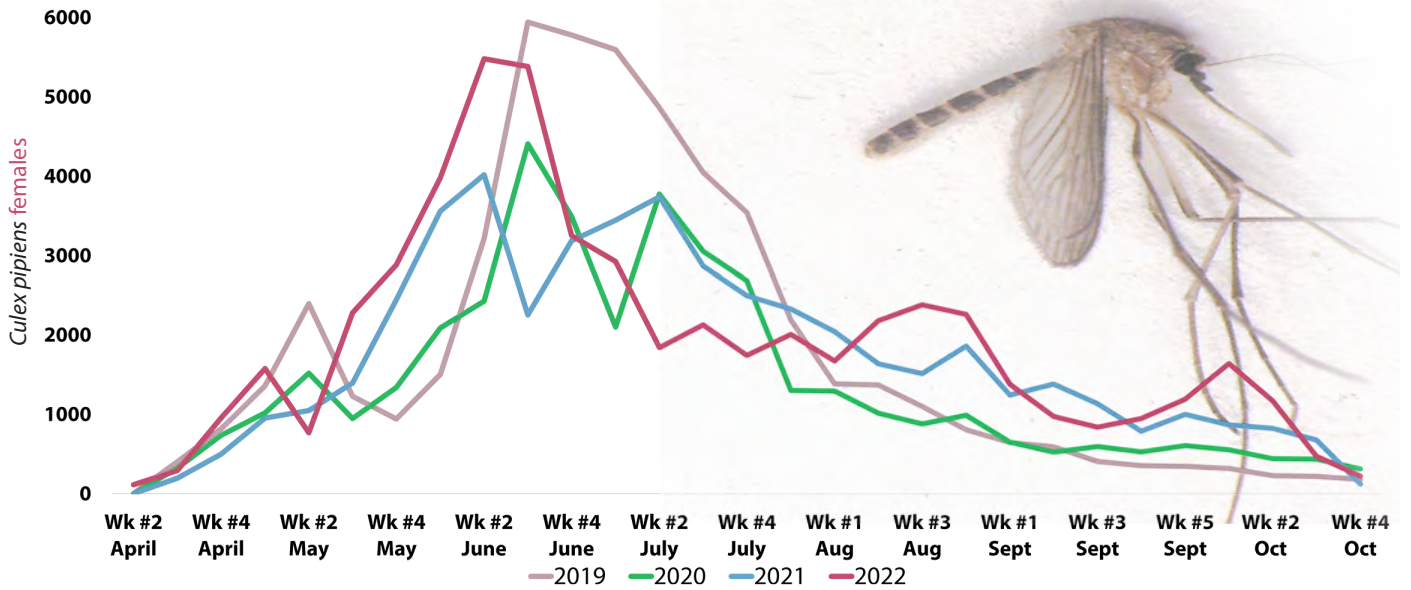


## Annual Total Female Mosquitoes

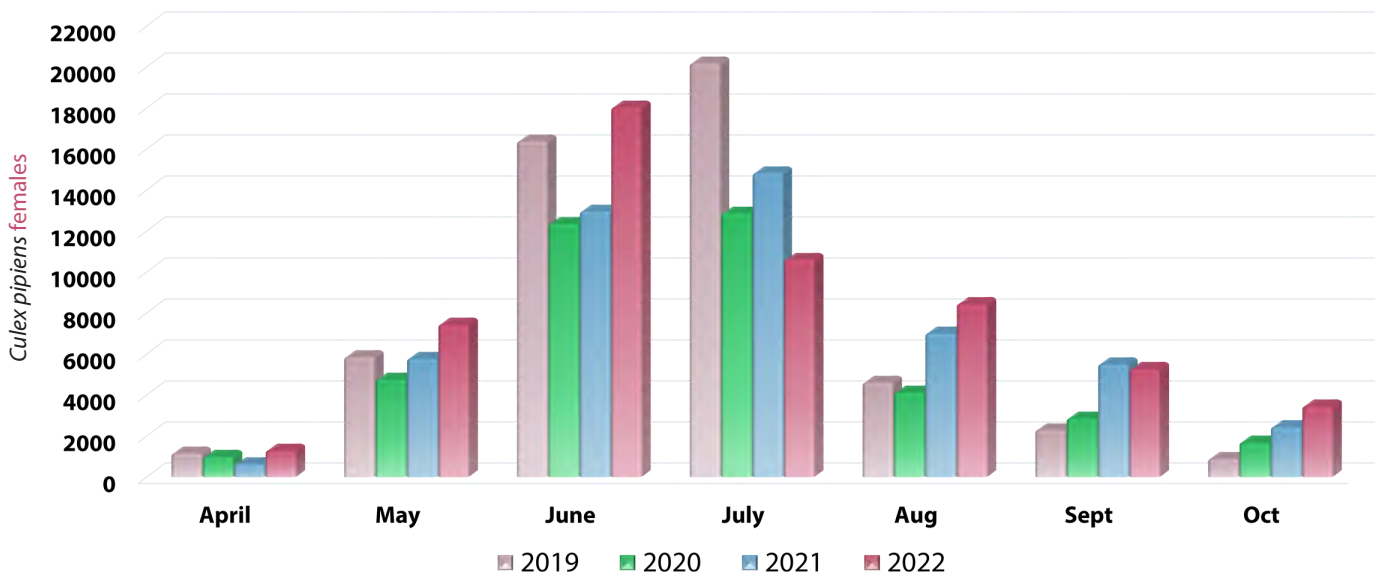


# 2022 GRAVID TRAP FLUCTUATIONS

## Gravid Trap Fluctuation By Week



## Gravid Trap Fluctuation By Month





# 2022 WEST NILE VIRUS ACTIVITY

## West Nile Virus Symptoms

### SERIOUS SYMPTOMS IN A FEW PEOPLE

About one in 150 people infected with West Nile virus (WNV) will develop severe illness. The severe symptoms can include high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, vision loss, numbness, and paralysis. These symptoms may last several weeks, and neurological effects may be permanent. WNV infection can be fatal.

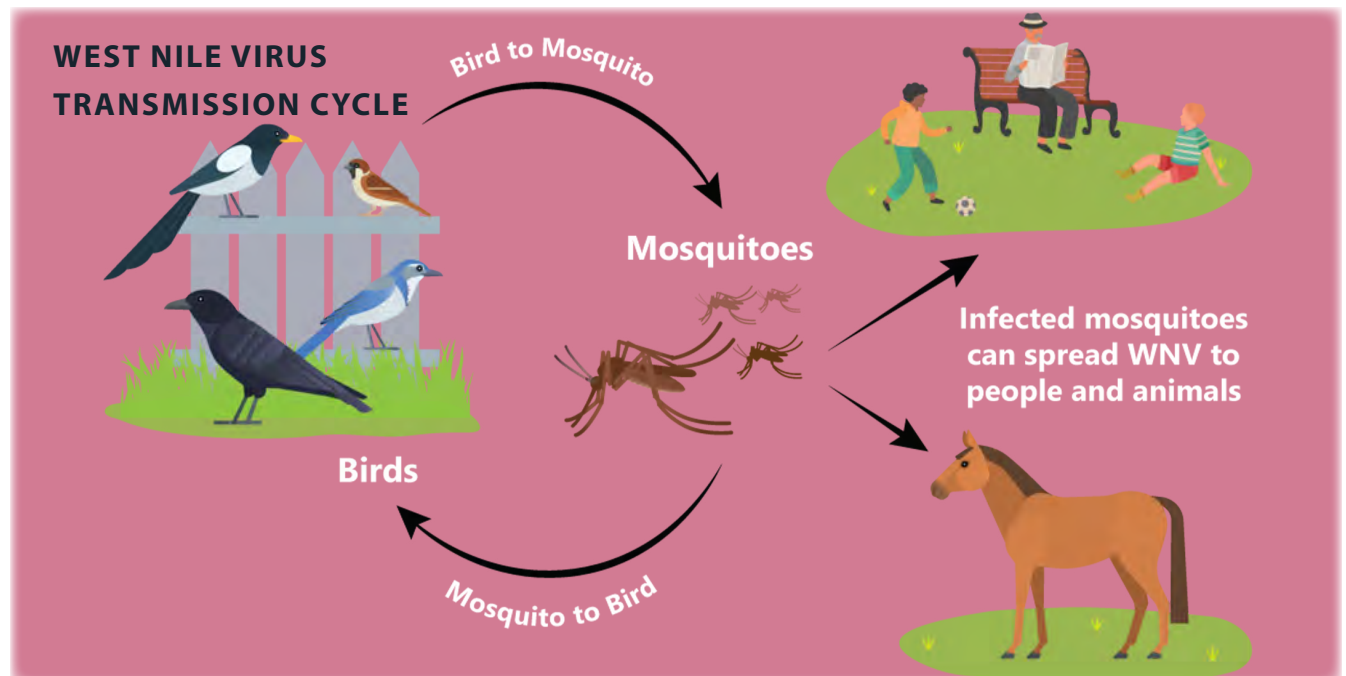
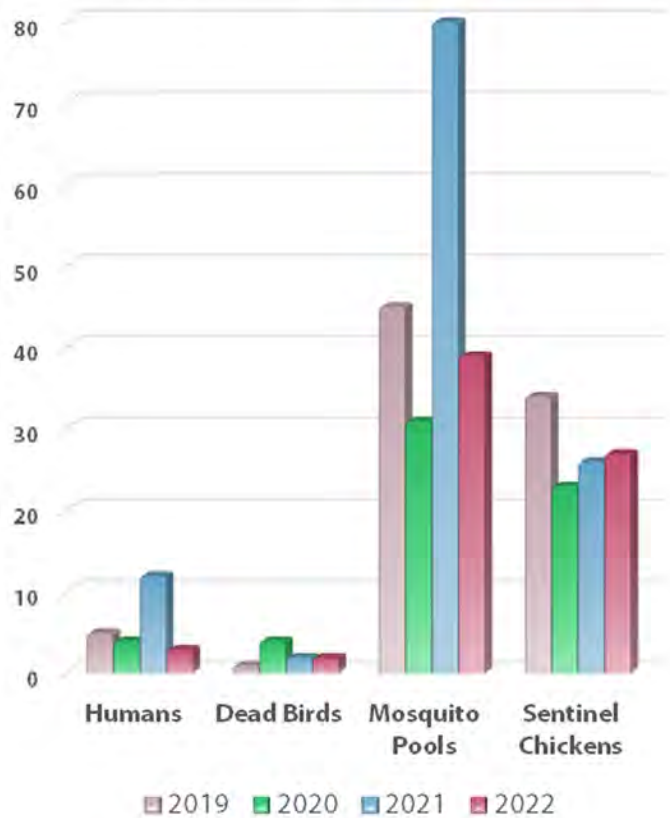
### MILDER SYMPTOMS IN SOME PEOPLE

Up to 20 percent of the people who become infected will display symptoms including fever, headache and/or body aches, nausea, vomiting, and sometimes swollen lymph glands or a rash on the chest, stomach, and back. Symptoms can last as little as a few days to several weeks.

### NO SYMPTOMS IN MOST PEOPLE

Approximately 80 percent of people (about 4 out of 5) who are infected with WNV will not have any symptoms at all.

## West Nile Virus Positives



# 2022 WEST NILE VIRUS ACTIVITY MAP



Mosquito Pool

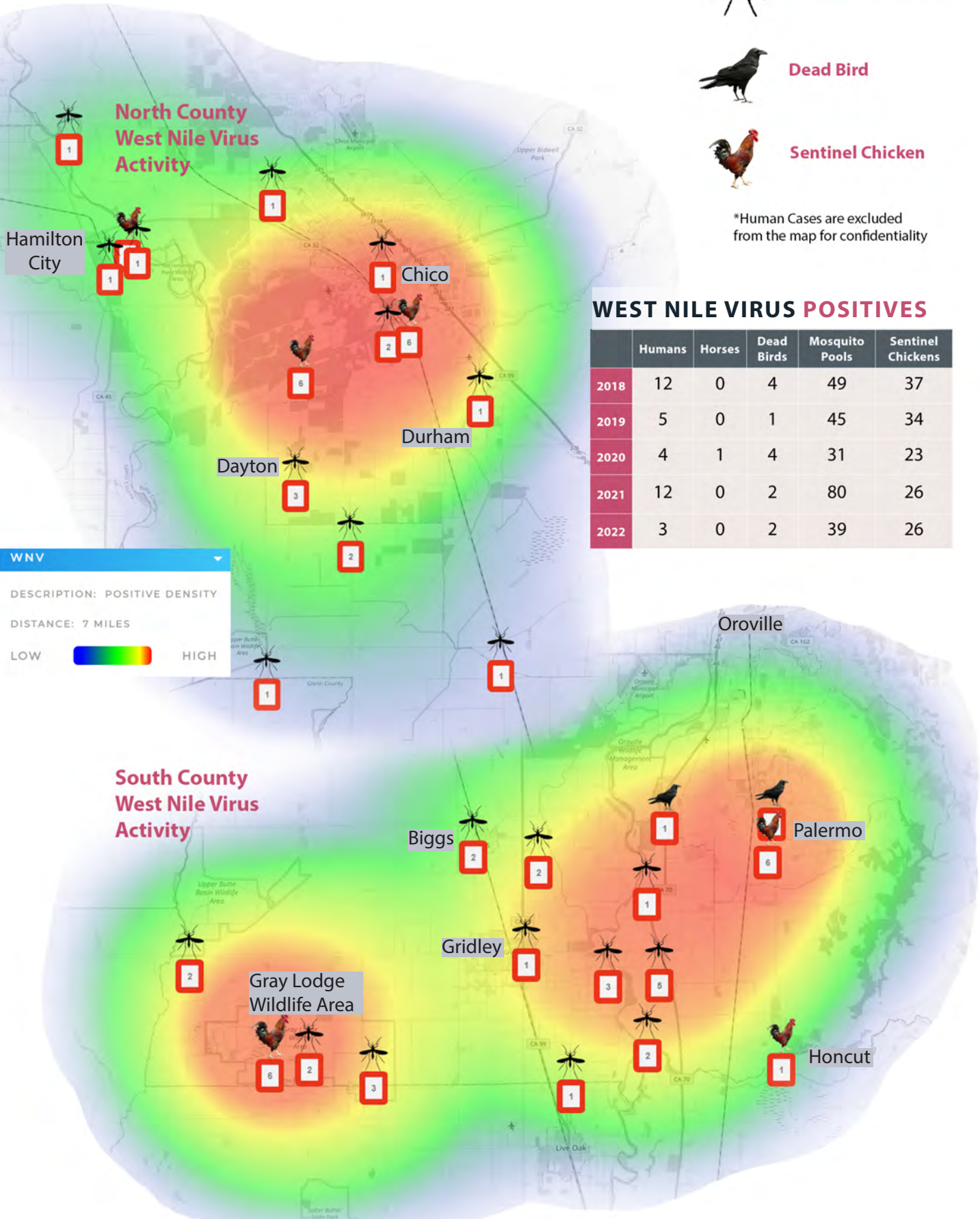


Dead Bird



Sentinel Chicken

\*Human Cases are excluded from the map for confidentiality



## WEST NILE VIRUS POSITIVES

	Humans	Horses	Dead Birds	Mosquito Pools	Sentinel Chickens
2018	12	0	4	49	37
2019	5	0	1	45	34
2020	4	1	4	31	23
2021	12	0	2	80	26
2022	3	0	2	39	26

**WNV**

DESCRIPTION: POSITIVE DENSITY

DISTANCE: 7 MILES

LOW HIGH

# 2022 WEST NILE VIRUS ACTIVITY IN CALIFORNIA COUNTIES MAP

WEEK 1 - WEEK 54 AS OF JAN 13, 2023

2022 2021 5 Yr. Avg



3,165  
MOSQUITO  
SAMPLES



145  
SENTINEL  
CHICKENS



16  
HORSES



170  
HUMAN CASES



186  
DEAD BIRDS

Counties with West Nile virus activity (no human cases)

Counties with West Nile virus activity (number of human cases)

Updated 01/13/23

**WestNile.ca.gov**

VECTOR-BORNE DISEASE SECTION • CA DEPT OF PUBLIC HEALTH

## TICK SURVEILLANCE

Tick surveillance in Butte County is done primarily because of the diseases that ticks can transmit. The two diseases that infect humans most often are Lyme disease and Tick-borne relapsing fever (TBRF).

Lyme disease is an infectious disease caused by a bacterium, *Borrelia burgdorferi*. TBRF is an infectious disease caused by a bacterium, *Borrelia miyamotoi*. Transmission of the Lyme disease and TBRF bacteria is primarily from the Western Black-Legged Tick. Both of these disease causative agents and the tick vector can be readily found in Butte County.

District tick surveillance consists of “flagging”, where a 3' x 2' piece of thick, fibrous cloth, is dragged along the edge of a trail or dirt road. The ticks attach themselves to the cloth while they are “questing” for a blood meal. Like a mosquito, the female tick needs a blood meal to lay her eggs. Once the ticks are attached to the cloth they are identified, counted, recorded, and then sent off for testing.

In 2022, 200 tick pools were sent off for testing with 14 coming back positive for Lyme disease and 13 coming back positive for TBRF. This information can lead to risk assessment warnings to residents in areas that have high tick activity.



## YELLOWJACKET SURVEILLANCE

Yellowjackets are medium sized black and yellow wasps (sometimes black and creme) that are often confused with honey bees, paper wasps, mud daubers, and other wasps. Yellowjackets are social insects that are considered beneficial. They can feed on garden pests and pollinate crops through daily foraging. Yellowjackets can become a public health concern because of their territorial behavior and their affinity for human food and drinks. Yellowjackets can restrict or prevent outdoor activities in areas such as campgrounds, picnic spots, and backyards.

The District will respond to reports of high yellowjacket activity. Mosquito and Vector Control Specialists will then inspect the area and decide if control is appropriate. Control measures may include placing traps or bait, treating nests with an approved insecticide, or physically removing the nest. All pesticide applications are made by state-certified technicians using materials that are registered for use by the Environmental Protection Agency.





Mosquitofish

## BIOLOGICAL CONTROL ·

Biological control is the intentional use of mosquito pathogens, parasites or predators to reduce the size of target mosquito populations. The most popular and successful biological tool is the mosquitofish, *Gambusia affinis*. Butte County Mosquito and Vector Control District maintains five fish ponds at the Oroville headquarters. These ponds produce hundreds of pounds of mosquitofish each year. The mosquitofish are routinely stocked and planted by District personnel to control mosquito populations in sources such as irrigation ditches, industrial, ornamental and artificial ponds, un-maintained swimming pools, semi-permanent and permanent urban sources, rice fields, and wetlands. Mosquitofish are omnivorous and have a voracious appetite for mosquito larvae. The flattened head and protruding mouth enable the fish to readily prey on surface feeding mosquito larvae and pupae. A large female can consume up to 300 larvae per day! All ages, sexes, and sizes of these fish eat mosquito larvae, along with other small aquatic invertebrates and algae. The fish are visual predators and feed during daylight hours. Due to insecticide resistance and environmental concerns associated with chemical control methods, biological control methods are expanding as an effective tool used in the control of mosquito populations.



*The Aquaculture center holds 3 Tanks stocked with about 6000 breeding adult fish each. The fry, born live, will instinctively swim upward and through the small holes of the breeding boxes. The holes are far too small for the adults, which is important in keeping the adults from eating their young. The fry are moved to a 4th tank to mature before being used throughout the county.*

Fish Plant 2022	Amount	Acres	Applications
Zone 1	11.32 lbs	22.64	80
Zone 3	3.22 lbs	6.44	46
Zone 4	2.98 lbs	5.96	12
Zone 6	11.27 lbs	22.54	56
Zone 8	39.00 lbs	78.00	191
Zone 9	1.40 lbs	2.80	9
Zone 10	13.06 lbs	27.02	44
Zone 11	6.45 lbs	12.90	39
Zone 12	10.34 lbs	21.18	36
Zone 14	0.15 lbs	0.30	1
<b>Total</b>	<b>99.19 lbs</b>	<b>199.778</b>	<b>514</b>

*Female Mosquitofish produce eggs that hatch within their bodies, releasing well-developed and very active young or "fry" into the water. Gambusia are prolific, producing three or four broods each summer, depending on the food supply and climate. A brood averages between 30 and 100 fry that reach maturity in three or four months*

## AQUACULTURE CENTER ·

Mosquito and Vector Control Districts across the nation are very familiar with mosquitofish, but most Districts are not as familiar with indoor aquaculture systems. BCMVCD has five ponds on site and a new indoor aquaculture program. The indoor program gives the District the ability to have fish year-round for the public as well as the ability to implement an intensive fish breeding program to replace fish populations in District ponds. The District's aquaculture center has four tanks. Two tanks are for fry production, one for the fry that's collected each day to mature, and the last is used as a holding/quarantine tank that is also used for fry production. The aquaculture center incorporates automatic vibratory feeders, in-line heaters, and dimmable ballast lighting. Studies have shown that consumption of feed, metabolism, and mating behaviors can be changed with light cycles and water temperatures. Temperature, pH, salinity, ammonia, nitrate, nitrite, alkalinity, and dissolved oxygen are tested daily. The District also practices a sustainable yield technique by selecting the correct seine size. This allows small fish to pass through and only large adults will be taken for District needs. These fish can then reach maturity, spawn, and help replenish fish stocks for the following year.

## CHEMICAL CONTROL

Chemical control is the use of target specific insecticides to reduce immature and adult mosquito populations. These chemicals are only applied when physical control, public education, and biological control methods are unable to keep mosquito populations tolerable or when emergency control measures dictate the use of chemicals to rapidly terminate or disrupt the transmission of disease to humans. There are two categories of chemicals used by the District, larvicides and adulticides. Larvicides target mosquito larvae and pupae. Adulticides target adult mosquitoes. The chemicals used by the District are registered with the United States Environmental Protection Agency (EPA), as well as the California Environmental Protection Agency (CAL EPA). The District relies mainly on larviciding as the primary means of chemical mosquito control. However, there are limitations to larviciding as a main control strategy. In Butte County where mosquito breeding occurs over large areas, the practical application of larvicides is not feasible and periodic adulticiding is necessary to protect nearby communities from the attack of adult mosquitoes. Also, there are areas that are environmentally sensitive and limit the use of larvicides. In these areas peripheral adulticiding is the only available option.



Mike Mattia  
Residual Spraying



Shane Cassity  
Calibrating



Jeremy Edwards  
Treating Drain



Night  
ULV Fogging



## 2022 MATERIALS USED

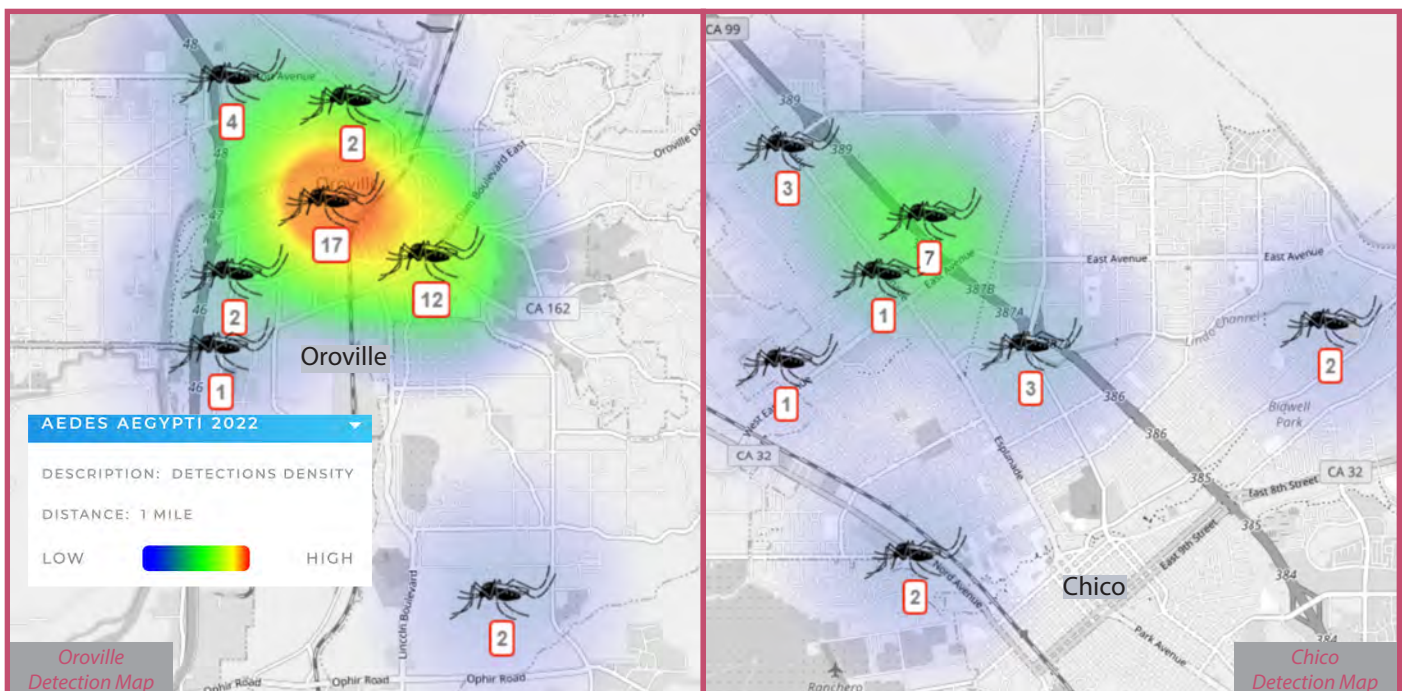
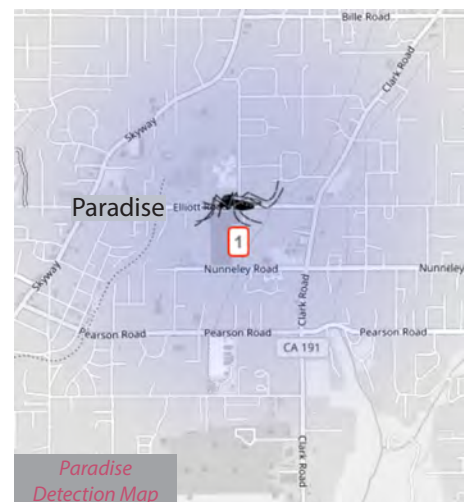
Material 2022	Amount	Acres	Applications
<b>Larvicides</b>			
Abate 4E	0.12 gals	11.00	11
Altosid SBG II	15,045.17 lbs	2,112.38	57
Altosid XR Extended Residual Briquets	401.00 each	0.94	67
Aquabac 200 G	14,310.14 lbs	1,895.05	66
Cocobear Mosquito Larvicide Oil	574.45 gals	185.31	1146
FourStar Briquets	487.00 each	1.12	165
MetaLarv S-PT	57.10 lbs	22.84	39
MetaLarv XRP	38.00 each	0.09	6
Natular DT	9,676.00 each	0.87	134
Natular G30	12.00 lbs	0.60	1
Natular XRT	6,167.00 each	14.19	451
VectoBac -12AS	4,616.56 gals	54,907.72	890
VectoBac WDG	100.00 lbs	210.91	4
VectoBac-G	48,484.32 lbs	5,285.04	165
VectoLex WDG	2.00 lbs	2.00	2
VectoMax WSP	692.00 each	0.80	225
VectoPrime	82.00 lbs	16.40	14
<b>Adulticides</b>			
Duet	6,265.66 lbs	173,660.70	687
Peri-X UL 4-4	5,780.03 lbs	61,017.16	465
Trumpet	1,020.00 gal	130,560.00	17
<b>Barrier Sprays</b>			
Suspend SC	5.79 gals	17.03	152
<b>Yellow Jacket Control</b>			
Drione Insecticide	0.09 gal	1.10	13
<b>Herbicides</b>			
Dimension 2EW Herbicide	1.06 gals	4.46	5
Cheetah Pro	0.14 gals	0.32	1
Finale Herbicide	4.50 gals	14.99	6
Garlon 4 Ultra	0.08 gals	0.16	1
Round Up Concentrate Plus	2.50 gals	0.55	3
Roundup Weed and Grass Killer Ready to Use	59.75 gals	0.41	14
<b>Aircraft Application</b>			
Rice Acres Treated	56,635		
Managed Wetlands Treated	7,564		
ULV Acres Treated	130,560	17 Night Flights	
Totals Acres Treated via Aircraft	194,759		

## CALIFORNIA INVASIVE SPECIES

Two invasive (non-native) mosquito species have recently been found in several California cities (see map below). They are named *Aedes aegypti* (the yellow fever mosquito) and *Aedes albopictus* (the Asian tiger mosquito).

In 2022, The District had 60 detections of *Aedes aegypti* at 15 different locations in the cities of Chico, Oroville, and Paradise. There have been no detections of *Aedes albopictus* in Butte County.

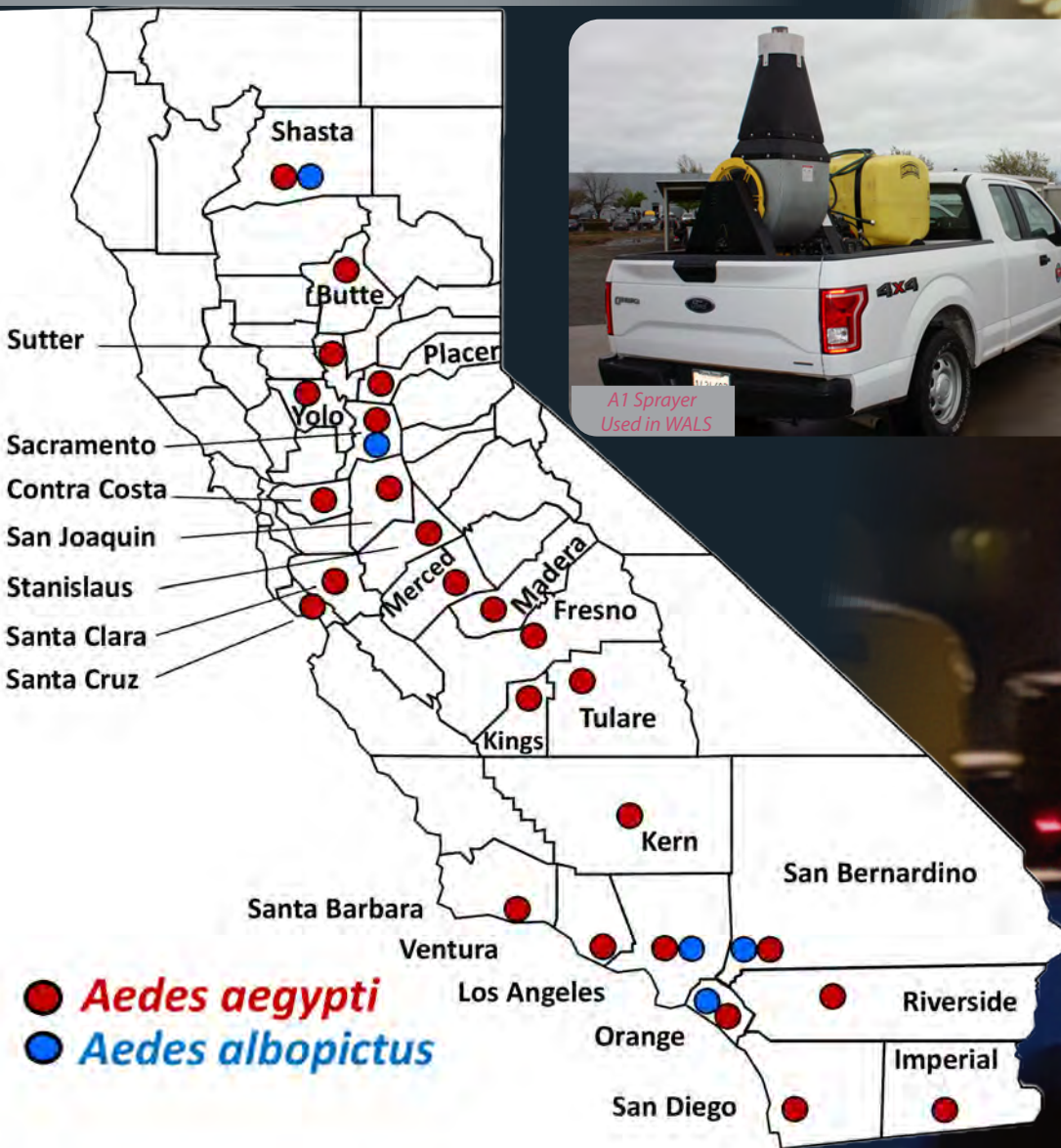
Unlike most native mosquito species, *Aedes aegypti* and *Aedes albopictus* bite during the day. Both species are small black mosquitoes with white stripes on their back and on their legs. They can lay eggs in any small artificial or natural container that holds water. *Aedes aegypti* and *Aedes albopictus* have the potential to transmit several viruses, including dengue, chikungunya, Zika, and yellow fever.



## WIDE AREA LARVICIDE SPRAY **WALS**

WALS stands for Wide Area Larvicide Spray. WALS is an approach to control larvae, such as invasive *Aedes*, that uses a naturally occurring bacterium (BTi) to kill mosquito larvae in the water before they emerge into biting adults. This is done with a powerful truck mounted sprayer that sends out a plume of small water droplets containing BTi with the hope that they will drift their way into the small containers around residences that *Aedes* species love to breed in. The WALS method is another tool that the District utilizes to combat the invasive *Aedes* in Butte County.

### INVASIVE AEDES PRESENT BY COUNTY





Tree Trimming

Building Fire Line

Metal Fabrication

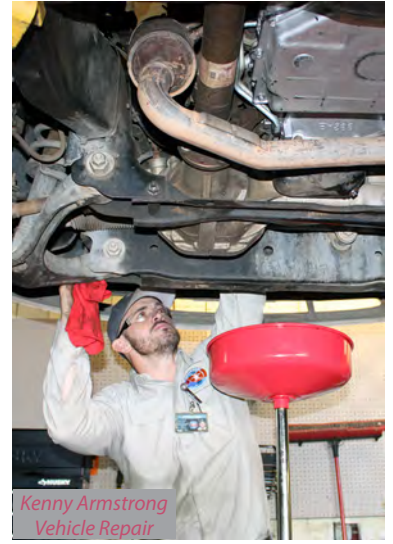
Fogger Maintenance

## DISTRICT SHOP

The District's shop provides the maintenance and repairs for over 30 vehicles, 3 forklifts, 1 backhoe, 3 ATV's, 2 amphibious Tritons, 2 loader trucks and 4 utility trailers. Additionally, the shop is responsible for the maintenance and repairs to the District's electric ULV foggers, gas ULV foggers, back cans, power sprayers, chainsaws, weed eaters, lawn mowers, etc. and other mechanical items. The shop is also responsible for repairing and installing improvements to the District facilities and grounds when and where necessary. Often the shop will repair the District's security system, lighting fixtures, plumbing fixtures, and other items as needed.

## AERIAL OPERATIONS

The District employs one full-time Pilot II. On average the planes make applications to over 150,000 acres each year. During down time, the 3 planes receive repairs and technological improvements and upgrades to instruments and panels, altimeter, Satloc, Ag-Nav, repainting, replacing engine parts, and routine annual maintenance. The Pilot II also is responsible for renting a passenger plane and providing aerial surveillance flights over seasonally flooded wetlands and duck clubs for the District's MVCS. In 2020 the District, with the help of District Pilot Del Boyd, had a new tank truck built.



Kenny Armstrong  
Vehicle Repair

## FRONT OFFICE

Professional and courteous customer service is the number one priority for the District's administrative staff. The tasks of the administrative personnel involve serving the residents of Butte County and Hamilton City, the employees of the District, accounting, budgeting, responding to telephone inquiries, maintaining public records, coordinating policies, and reporting to the Board of Trustees.



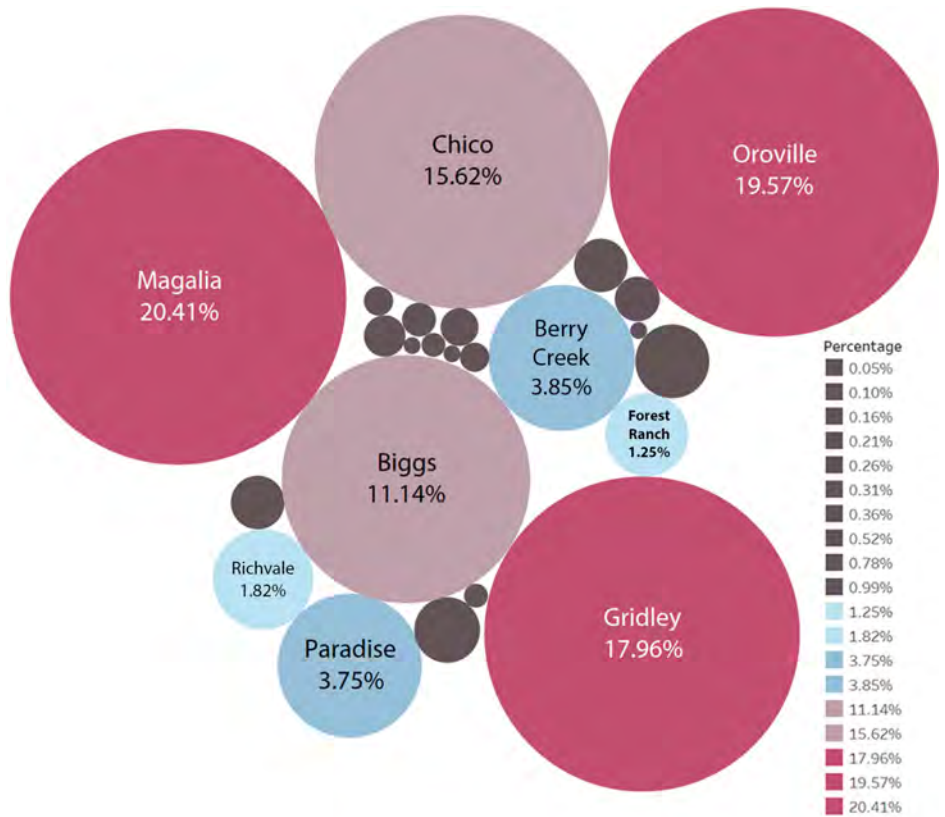
Jaws' En Route to Treatment



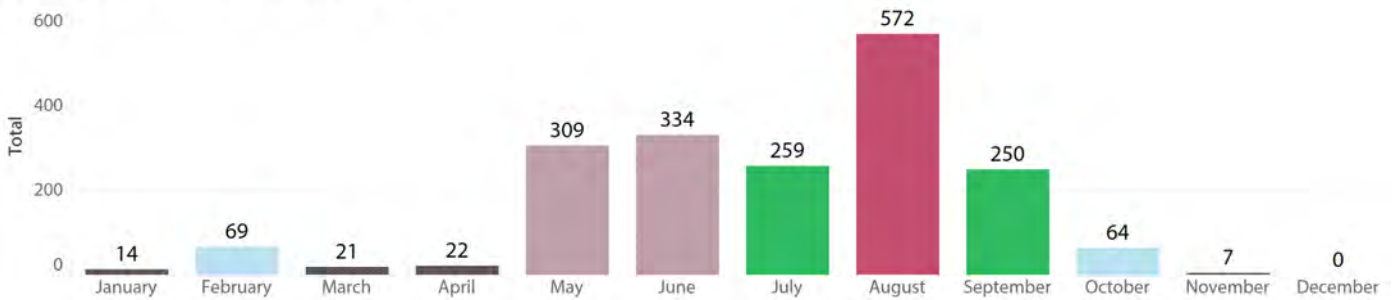
Office Assistant  
Sara MacKenzie

## SERVICE REQUESTS

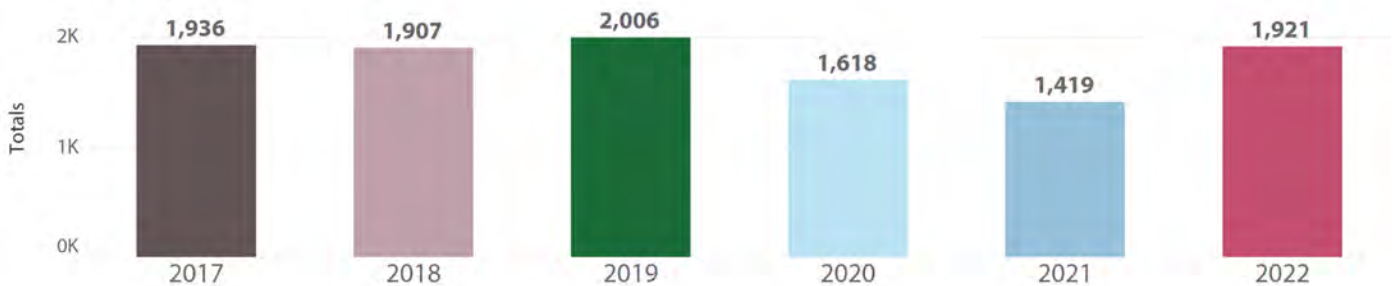
Magalia	20.41%	392
Oroville	19.57%	376
Gridley	17.96%	345
Chico	15.62%	300
Biggs	11.14%	214
Berry Creek	3.85%	74
Paradise	3.75%	72
Richvale	1.82%	35
Forest Ranch	1.25%	24
Forbestown	0.99%	19
Palermo	0.78%	15
Stirling City	0.52%	10
Durham	0.52%	10
East Biggs	0.36%	7
Dayton	0.31%	6
Butte Valley	0.26%	5
Cohasset	0.21%	4
Hamilton City	0.16%	3
Bangor	0.16%	3
Other	0.10%	2
Clipper Mills	0.10%	2
Feather Falls	0.05%	1
Concow	0.05%	1
Brush Creek	0.05%	1



### Service Requests Per Month 2022



### Service Requests Per Year



## SPECIAL BENEFIT ASSESSMENT

To address the growing needs placed upon the district and to expand and enhance existing services, the District attempted and passed a Special Benefit Assessment on all properties within the District's Service Area. With these additional revenues the District has the ability to enhance/improve all services provided by the District. Below is a non-exhaustive list of services that have been and continue to be enhanced:

- Increase seasonal staff and possibly permanent staff to better the services the District provides (e.g. surveillance, control, education, etc.)
- Expand the District's public education and outreach program to better educate those that the District serves to services provided, the elimination of mosquito and other vector habitat, and how to protect oneself from mosquito and vector-borne disease.
- Expand the District's mosquito surveillance program to better identify mosquitoes of medical importance, increase the amount of traps used, increase the amount of mosquitoes tested, commence with the surveillance of invasive species such as Asian Tiger Mosquito and Yellow Fever Mosquito (both of which have been introduced into California) and also to expand mosquito testing of newly introduced mosquito-borne disease such as chikungunya virus, Rift Valley fever, dengue fever, and others.
- Expand the District's tick surveillance to monitor more public use lands, test collected ticks for the presence of tick-borne disease, and conduct tick control trials.
- Expand and improve the District's mosquitofish program. Purchase mosquitofish rearing tanks to provide an environment in which mosquitofish propagate year-round rather than seasonally allowing the District to keep up with the requests of the public and to have more fish available to District staff to stock in mosquito-breeding areas to lower larval mosquito populations.
- Increase the amount of public health pesticide applications should surveillance data indicate a need based on treatment thresholds and/or resident service requests. Possibly lower the treatment thresholds for larvae and adult mosquitoes.
- Purchase new capital such as spray equipment and vehicles to lower maintenance costs, increase fuel mileage, and increase the reliability of service.
- Continue to and enhance investing in mosquito control research and new technology to identify better ways of protecting the public's health.

This funding measure has strengthened, enhanced, and improved the District's baseline services provided. With newly introduced invasive species as well as new and reemerging vector-borne disease, mosquito and vector control's importance will only continue to grow.

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## TRANSPARENCY AWARD

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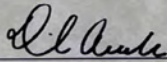
# District Transparency Certificate of Excellence

July 2021– September 2024

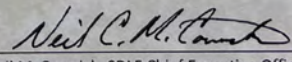
The Special District Leadership Foundation is proud to present this  
District Transparency Certificate of Excellence to

## Butte County Mosquito & Vector Control District

In recognition of the district's completion of all transparency program requirements  
designed to promote transparency in their operations and governance  
to the public and other stakeholders.



David Aranda, SDLF Board President



Neil McCormick, SDLF Chief Executive Officer

For the 8th year in a row, the Butte County Mosquito and Vector Control District (District) received the Transparency Certificate of Excellence by the Special District Leadership Foundation (SDLF) in recognition of the District's outstanding efforts to promote transparency and good governance. In order to receive the award, a special district must demonstrate the completion of

eight essential governance transparency requirements, including conducting ethics training for all board members, properly conducting open and public meetings, and filing financial transactions and compensation reports to the State Controller in a timely manner. The Butte County Mosquito and Vector Control District also fulfilled fifteen website requirements, including

providing readily available information to the public, such as board agendas, past minutes, current district budgets, and the most recent financial audit. Finally, the District must have demonstrated outreach to its constituents that engages the public in its governance, through regular district newsletters and community engagement projects.

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"This award is a testament to the Butte County Mosquito and Vector Control District's commitment to open government," said Matthew Ball, District Manager. "The District's entire Board of Trustees and staff are to be commended for their contributions that empower the public with information and facilitate engagement and oversight."

## FISCAL YEAR 2021/2022 FINANCIALS

	Budgeted	Actual	Favorable (Unfavorable)
<b>Revenue</b>	\$ 4,596,361.00	\$ 6,353,108.14	\$ 1,756,747.14
<b>Expenses</b>			
<b>Salaries &amp; Benefits</b>	\$ 3,011,587.00	\$ 2,669,847.84	\$ 341,739.16
<b>Services &amp; Supplies</b>			
Gas, Oil & Grease	\$ 120,000.00	\$ 120,381.63	\$ (381.63)
Repairs & Parts - Airplanes	\$ 30,500.00	\$ 28,144.97	\$ 2,355.03
Repairs & Parts	\$ 42,000.00	\$ 40,530.03	\$ 1,469.97
Office Supplies	\$ 20,000.00	\$ 19,009.07	\$ 990.93
Education & Publicity	\$ 70,000.00	\$ 69,953.29	\$ 46.71
Insecticides	\$ 890,000.00	\$ 831,088.46	\$ 58,911.54
Tools & Equipment	\$ 65,000.00	\$ 68,277.83	\$ (3,277.83)
Communications	\$ 25,000.00	\$ 25,116.37	\$ (116.37)
Travel	\$ 3,000.00	\$ 2,408.05	\$ 591.95
Utilities	\$ 40,000.00	\$ 37,875.35	\$ 2,124.65
Rent	\$ 5,000.00	\$ 732.00	\$ 4,268.00
Special Services	\$ 225,000.00	\$ 198,739.32	\$ 26,260.68
Trustee Allowance	\$ 13,200.00	\$ 9,600.00	\$ 3,600.00
General Insurance	\$ 155,000.00	\$ 152,669.59	\$ 2,330.41
Employee Training & Dues	\$ 13,000.00	\$ 12,228.39	\$ 771.61
District Fees and Permits	\$ 37,000.00	\$ 36,755.11	\$ 244.89
Miscellaneous	\$ 15,000.00	\$ 11,687.01	\$ 3,312.99
Research Supplies	\$ 50,000.00	\$ 37,883.18	\$ 12,116.82
Alternate Technology	\$ 1,000.00	\$ -	\$ 1,000.00
Special Discretionary	\$ 20,000.00	\$ 18,693.77	\$ 1,306.23
Gambusia	\$ 15,000.00	\$ 6,889.66	\$ 8,110.34
<b>Total Services &amp; Supplies</b>	\$ 1,854,700.00	\$ 1,728,663.08	\$ 126,036.92
<b>Capital Outlay</b>			
Buildings and Improvements	\$ 40,000.00	\$ 16,887.51	\$ 23,112.49
Vehicles	\$ 135,000.00	\$ 151,625.26	\$ (16,625.26)
Spray Equipment	\$ 20,000.00	\$ -	\$ 20,000.00
Aircraft	\$ 25,000.00	\$ 19,898.48	\$ 5,101.52
Office Equipment	\$ 2,000.00	\$ -	\$ 2,000.00
Laboratory Equipment	\$ 2,000.00	\$ -	\$ 2,000.00
Shop Equipment	\$ 2,000.00	\$ -	\$ 2,000.00
Education and Publicity	\$ 2,000.00	\$ -	\$ 2,000.00
Miscellaneous Capital Outlay	\$ 1,000.00	\$ -	\$ 1,000.00
Communications Capital Outlay	\$ 1,000.00	\$ -	\$ 1,000.00
<b>Total Capital Outlay</b>	\$ 230,000.00	\$ 188,411.25	\$ 41,588.75
<b>Appropriation for Contingencies</b>	\$ 1,149,072.00	\$ -	\$ 1,149,072.00
<b>Total Expense</b>	\$ 6,245,359.00	\$ 4,586,922.17	\$ 1,658,436.83
Cash in Treasury Cash		\$ 8,225,411.65	
Cash in Petty Cash		\$ 2,500.00	
<b>Total Cash</b>		\$ 8,227,911.65	



# FISCAL YEAR 2021/2022 FINANCIALS

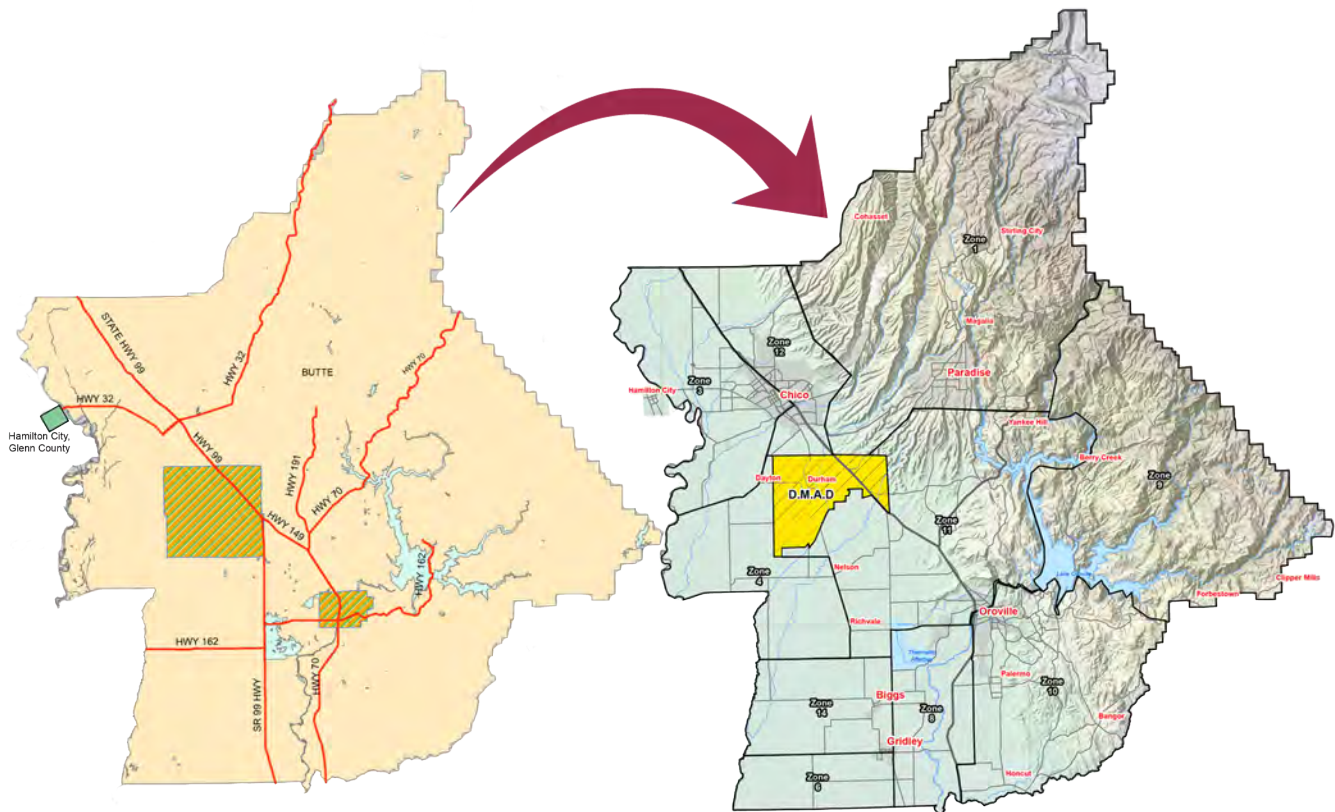
## Butte County Mosquito and Vector Control District

### Balance Sheet June 30, 2022

	General Fund	Reclassifications & Eliminations	Statements of Net Position
<b>Current assets:</b>			
Cash and investments (note 2)	\$ 7,971,121	-	7,971,121
Cash and investments (note 2)	129,585	-	129,585
Accrued interest receivable	15,099	-	15,099
Accounts receivable – charge for services	41,471	-	41,471
Materials and supplies inventory	693,350	-	693,350
Prepaid expenses	28,643	-	28,643
<b>Total current assets</b>	<u>8,879,269</u>	<u>-</u>	<u>8,879,269</u>
<b>Non-current assets:</b>			
Capital assets, not being depreciated (note 3)	-	615,403	615,403
Capital assets, being depreciated (note 3)	-	2,654,437	2,654,437
<b>Total non-current assets</b>	<u>-</u>	<u>3,269,840</u>	<u>3,269,840</u>
<b>Total assets</b>	<u>8,879,269</u>	<u>3,269,840</u>	<u>12,149,109</u>
<b>Deferred outflows of resources:</b>			
Deferred pension outflows (note 7)	-	714,519	714,519
<b>Total deferred outflows of resources</b>	<u>-</u>	<u>714,519</u>	<u>714,519</u>
<b>Current liabilities:</b>			
Accounts payable and accrued expenses	56,248	-	56,248
Accrued salaries and benefits	37,733	-	37,733
Long-term liabilities – due within one year:			
Compensated absences (note 4)	-	105,587	105,587
Termination benefits (note 5)	-	19,800	19,800
Lease obligation (note 6)	-	2,364	2,364
<b>Total current liabilities</b>	<u>93,981</u>	<u>127,751</u>	<u>221,732</u>
<b>Non-current liabilities:</b>			
Long-term liabilities – due in more than one year:			
Compensated absences (note 4)	-	422,349	422,349
Termination benefits (note 5)	-	23,925	23,925
Lease obligation (note 6)	-	69,318	69,318
Net pension liability (note 7)	-	2,633,821	2,633,821
<b>Total non-current liabilities</b>	<u>-</u>	<u>3,149,413</u>	<u>3,149,413</u>
<b>Total liabilities</b>	<u>93,981</u>	<u>3,277,164</u>	<u>3,371,145</u>
<b>Deferred inflows of resources:</b>			
Deferred pension inflows (note 7)	-	2,412,596	2,412,596
<b>Total deferred inflows of resources</b>	<u>-</u>	<u>2,412,596</u>	<u>2,412,596</u>
<b>Fund balance:</b> (note 8)			
Restricted	129,585	(129,585)	-
Non-spendable	721,993	(721,993)	-
Assigned	527,936	(527,936)	-
Unassigned	7,405,774	(7,405,774)	-
<b>Total fund balance</b>	<u>8,785,288</u>	<u>(8,785,288)</u>	<u>-</u>
<b>Total liabilities and fund balance</b>	<u>\$ 8,879,269</u>		
<b>Net position:</b> (note 9)			
Net investment in capital assets		3,198,158	3,198,158
Restricted		129,585	129,585
Unrestricted		3,752,144	3,752,144
<b>Total net position</b>		<u>7,079,887</u>	<u>7,079,887</u>

\*Insert from Fiscal Year 2021/2022 Annual Fiscal Report

# ANNEXATIONS OF SERVICE AREAS



**PREVIOUS SERVICE AREA MAP**

**NEW SERVICE AREA MAP**

The Butte County Mosquito and Vector Control District (BCMVC) covers nearly 1,800 square miles, and includes all of Butte County, except the small areas served by the Durham (DMAD) which was formed earlier. The District also includes Hamilton City, 199 acres or 638 parcels, and wetlands along the eastern border of Glenn County.

- In June of 2018, the Local Agency Formation Commission of Butte County (LAFCo) adopted resolution No. 13 2017/18 approving the detachment and annexation of a portion of the DMAD territory to the BCMVC, increasing the District's service area by 14,775 acres of mixed agriculture and 92 parcels.
- In August 2020, LAFCo adopted Resolution No. 01 2020/2021 approving the reorganization/dissolution of the OMAD and subsequent annexation of territory to the BCMVC. The annexation was finalized in 2021, adding approximately 7,660 acres, 8,142 parcels, of service area to the BCMVC and thus transferred the responsibility for mosquito abatement services in that area to the BCMVC.

Collectively, all these areas served by the BCMVC are known as the "Service Area." The BCMVC is the only agency providing mosquito and vector control and vector-borne disease protection and prevention services in the Service Area and provides its services to properties accommodating approximately 220,000 residents.



**District Headquarters**  
**5117 Larkin Rd.**  
**Oroville, CA 95965**



**District Substation**  
**444 Otterson Dr.**  
**Chico, CA 95928**

